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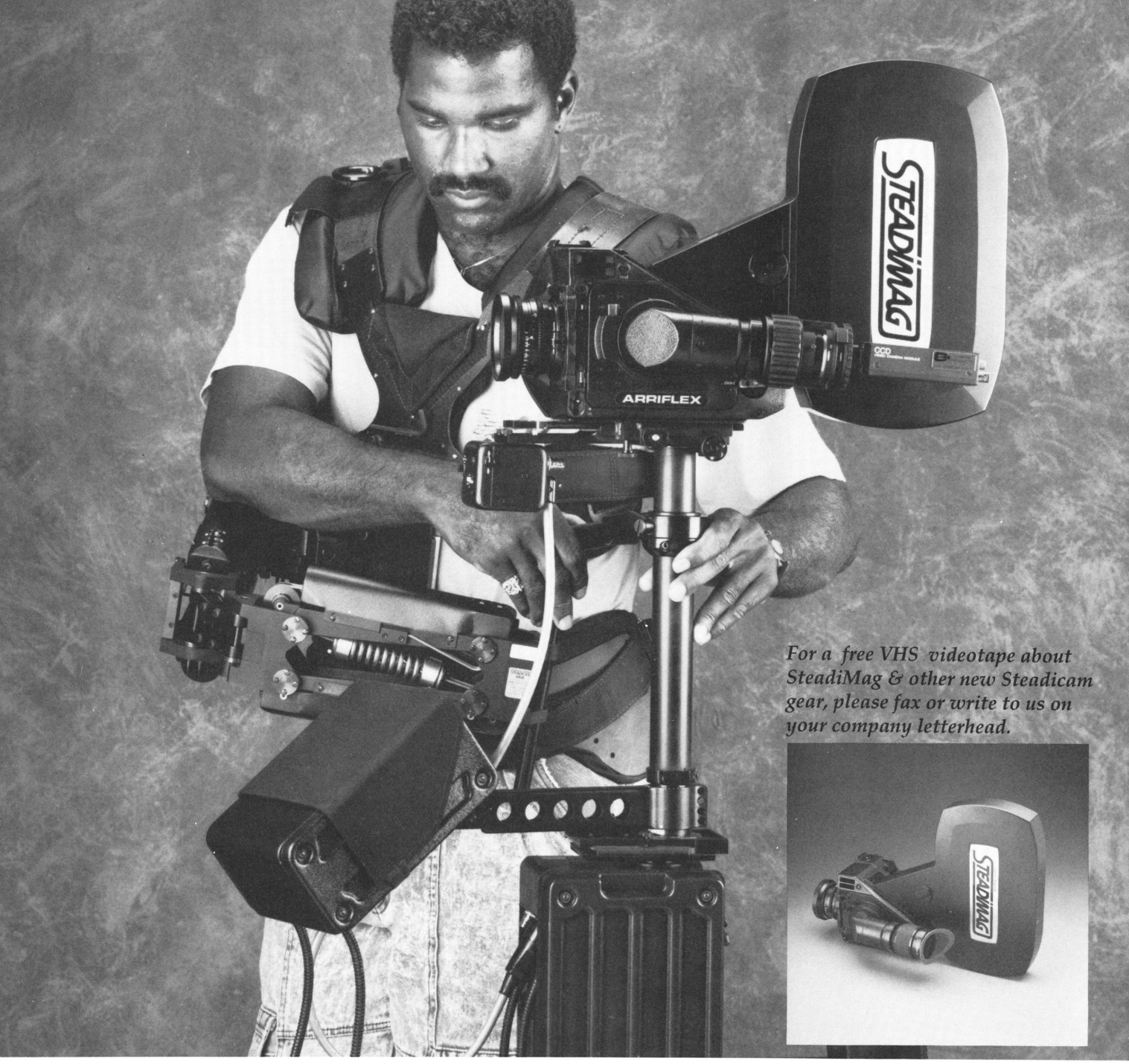

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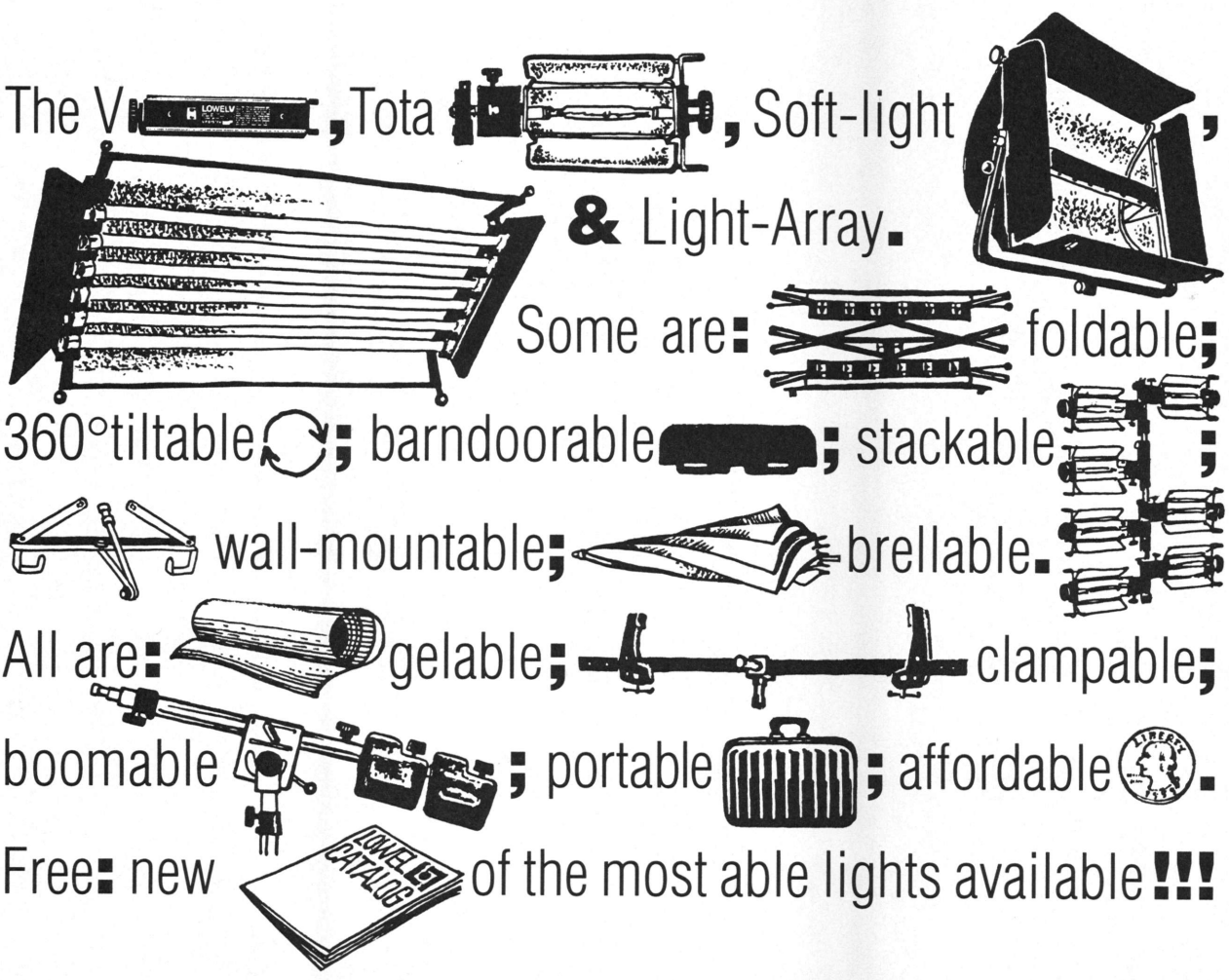

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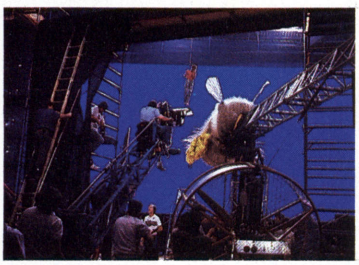
December 1989 Vol. 70 No. 12

American Cinematographer

Features



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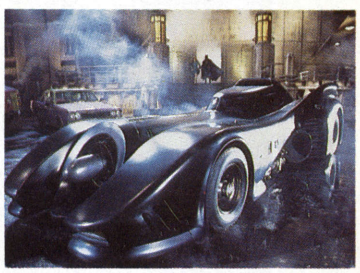

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On Our Cover:
The famous DeLorean from *Back to the Future, Part II* travels through time. (Composite made at ILM)

Contributing Authors:
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Nora Lee
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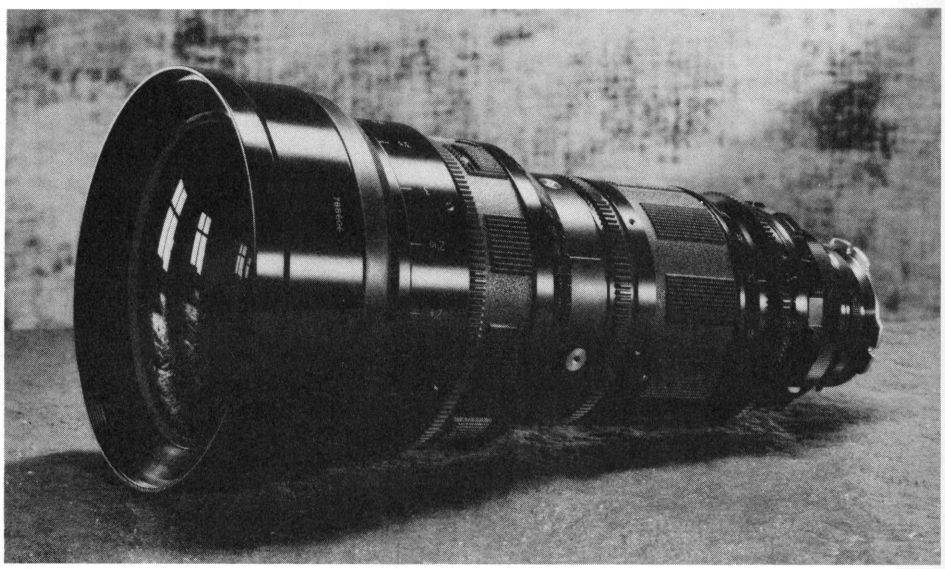

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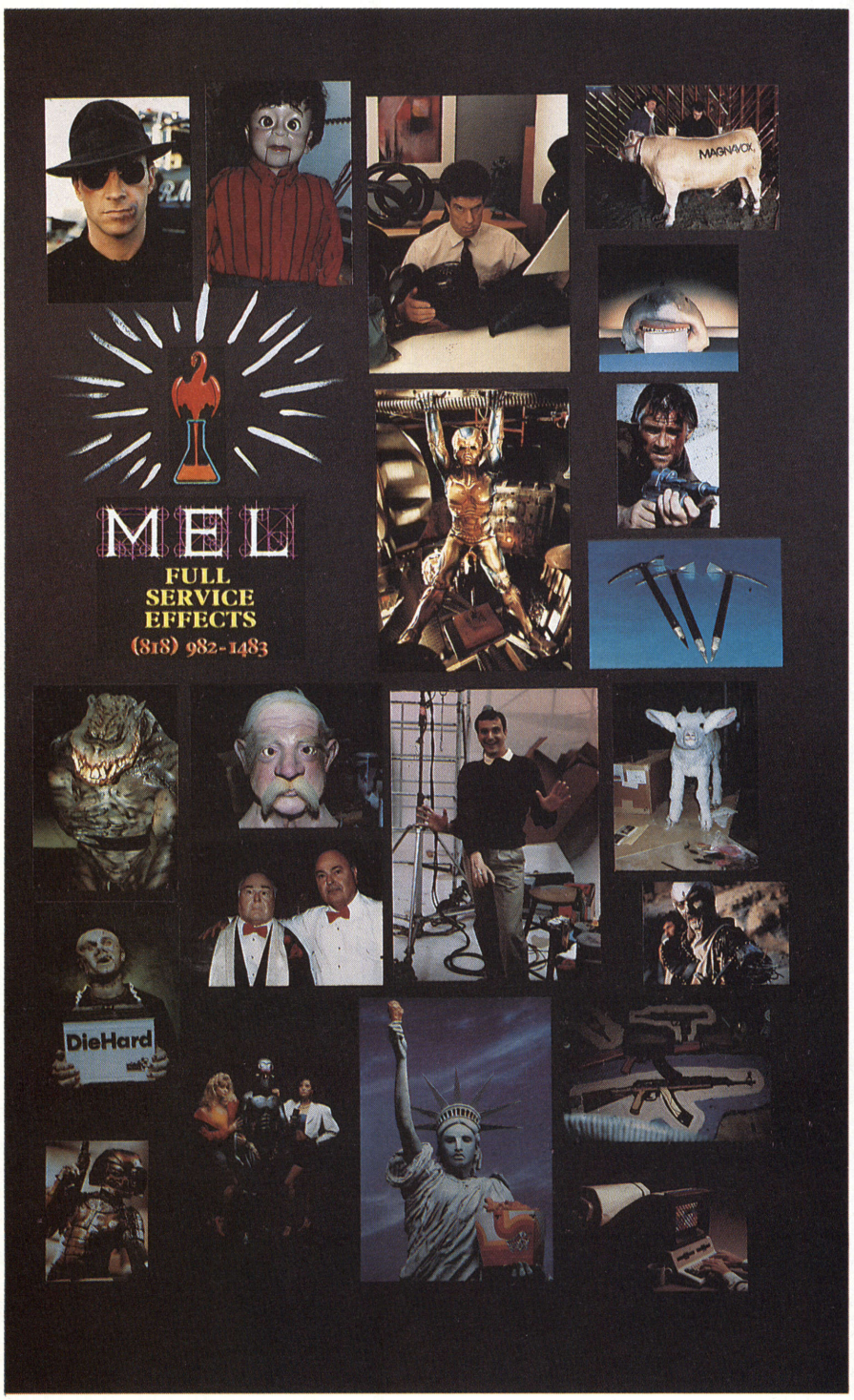

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The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as directors of photography and have demonstrated outstanding ability. ASC membership has become one of the highest honors that can be bestowed upon a professional cinematographer—a mark of prestige and excellence.

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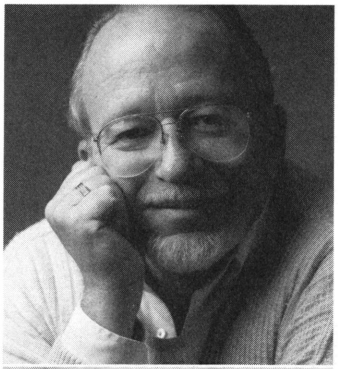
Listen to What They're Saying About Angenieux's New 17-102mm Zoom.



"The wide angle range is very useful. In addition to being tack sharp with very good contrast, this lens offers extremely pleasing color rendition."
BOB EBERLEIN
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Los Angeles

"This lens yields excellent color & contrast. It is so versatile that it soon became the main lens on our current feature 'Morishige Junrei'."
KOUZO OKAZAKI
Director of Photography
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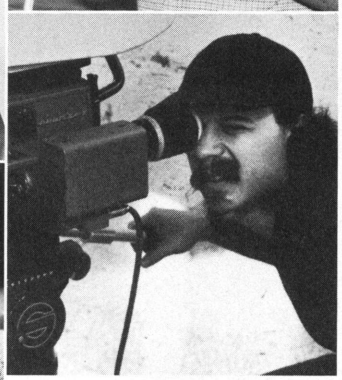

"The internal focus minimizes lens breathing and makes it easy to match this lens to the matte box. The readily accessible internal glass filters, the large, legible markings and the convenience of setting the lens from both sides are all real advantages."
MICHAEL FALASCO
Cameraman
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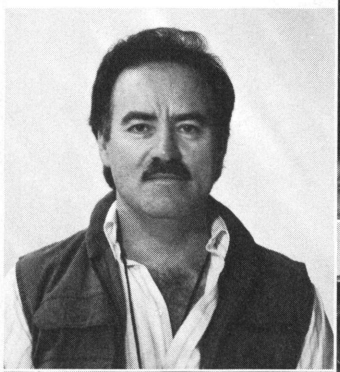
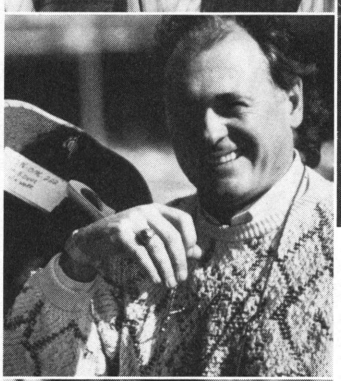
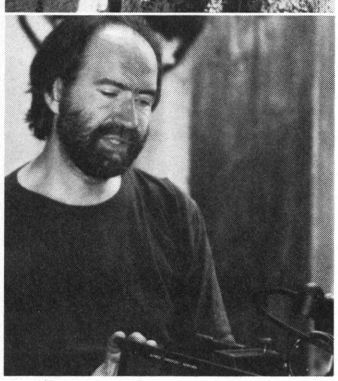


"When I heard about the 17-102, I wanted to use it so much, I split the rental cost with the production company. I wasn't disappointed. It was sharp and exhibited great resistance to flair. It's a nice clean lens."
PAUL ONORATO
Director of Photography
Los Angeles



"I find the contrast & resolution the finest I have ever seen in a zoom lens. I currently use the lens for about 60% of my work."
BERT DUNK
Director of Photography
Toronto



"We have exclusively used Angenieux 6x17 & 10x25HP lenses throughout our current production. The extreme wide angle of the 6x17 saved us all lots of shots and the lack of optical pumping whilst focusing was a great advantage."
JEAN LEPINE
Director of Photography
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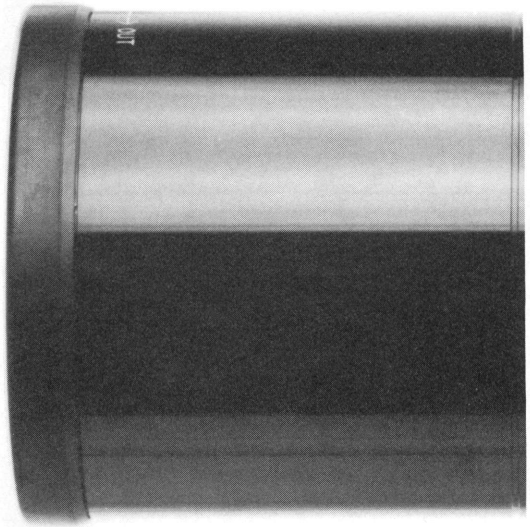

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18½–55½ Technovision Cooke T2.4
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20–100mm Cooke T3.1
20–120mm Angenieux T2.9
23–460mm Century Angenieux T8
25–250mm Cooke T4 or T3.9
25–250 Technovision Cooke T2.3
25–250mm Angenieux T3.9
25–250mm Angenieux HP T3.7
25–120mm Canon T2.8
150–600mm Clairmont/Canon f/5.6

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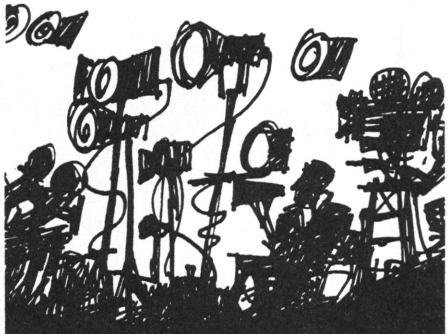

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Letters

Robert Stevens

I regret to inform readers of the passing of Robert Stevens, director of Rod Serling's unforgettable *Walking Distance* (see American Cinematographer, June 1988), 45 episodes of *Alfred Hitchcock Presents,* and scores of *Playhouse 90s.* He was 68.

A resident of Sutton Place in Manhattan, he was vacationing at his Westport, Connecticut summer home when he was brutally assaulted on August 7. Before going into cardiac arrest, he was able to name his assailant, who was later apprehended by police.

Stevens was one of the pioneers of New York television. With Martin Manulis, he produced and directed the *Suspense!* series for CBS from 1949-1952. His mirror shots and bizarre camera angles were much admired by Hitchcock. He worked closely with Lionel Lindon, ASC, and John Russell, ASC in creating arch lighting schemes and imaginative compositions for the Hitchcock shows. *Premonition* with John Forsythe, *The Magic Shop* with Leslie Neilsen, and *The Glass Eye* were among his most memorable television Hitchcocks. The latter won him an Emmy in 1957.

I knew Stevens to be eccentric and reclusive, an avid theater and moviegoer. We had planned to write a book together on early television. He was a television director with an extraordinary visual sense. As Hitchcock once told him, he could set up a shot better than anyone. He should be remembered that way.

—Paul Mandell
New York City

Back to the Wall

Stuart E. Bonwit is picking the wrong nit about my video wall article in his letter 'One Nit' in September American Cinematographer.

Any 4 x 4 NTSC video wall does indeed deliver 2100 lines of horizontal resolution. Of course, to utilize it, one must have a source with 2100 lines — such as multiple decks, multiple camera feeds, computer graphics output, etc. I am sorry if this was not clear from the wording in the article. The reason I raised the issue was to illustrate a point understood by anyone using video walls — that an inexpensive alternative (and perhaps superior) HDTV system for theatrical exhibition already exists in video wall technology.

Mr. Bonwit says Anna Alworthy "deserves a lot of credit for the many innovations she brought to the production." I certainly agree, but think it should be made clear to readers that she is the fictional heroine of *Envy, Jealousy and Revenge,* played by Felicia Lansbury.

—Laurence Jarvik
UCLA Dept. of
Film/Television

But, Do You Like Us?

The primary drawback to American Cinematographer is the quality of writing. There are entirely too many poorly structured sentences and incorrect usage of grammar. When you have acquired writers with something more than merely basic writing skills and an editor with some actual talent and imagination, I will be happy to subscribe again.

—Susan Symore
Los Angeles

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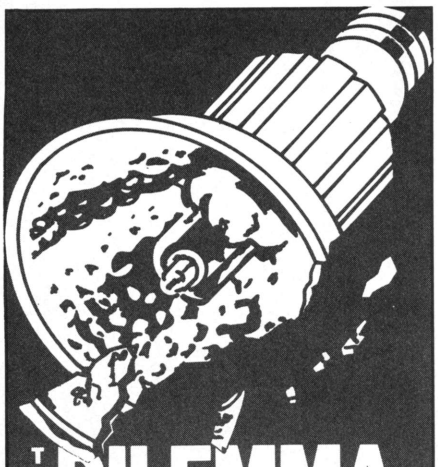

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The Bookshelf

by George L. George

Extensively researched, acutely perceptive and evenhanded in its evaluation, Patrick McGilligan's massive biography, **Robert Altman: Jumping off the Cliff** probes the mythology surrounding the maverick director. Altman emerges as a complex man, self-indulgent and often irrational but gifted with a unique vision of the film medium *(St. Martin's, NYC, $24.95).*

In **King Vidor, American,** Raymond Durgnat and Scott Simmon find in Vidor's idealistic fervor the unifying factor of his films' divergent themes. Pacifism in *The Big Parade,* sentimentality in *The Champ,* feminism in *Stella Dallas* and right-wing dialectics in *The Fountainhead* are viewed as complementary facets of Vidor's central concern *(U. of California Press, Berkeley, $32.50).*

The expanded edition of Norman Kagan's **The Cinema of Stanley Kubrick** provides insights into the director's personality and working methods, reviews his early films and pinpoints the social and ethical motivations of his alienated characters' destructive tendencies *(Continuum, NYC, $12.95).*

Now in paperback, Ted Gallagher's **John Ford: The Man and His Films,** a definitive biography of one of America's greatest directors, is a thorough and penetrating account of Ford's contribution to cinema *(U. of California Press, Berkeley, $14.95).*

Prof. Laura Oswald's **Jean Genet and the Semiotics of Performance** examines the films, novels and plays of the iconoclastic French writer. It interprets Genet's rough trade rhetoric as the struggle of a social outcast seeking integration into the conformist, heterosexual world *(Indiana U. Press, Bloomington, $32.50).*

The screen portrayal of women and their involvement in the medium are considered in **Women and Film,** edited by Janet Todd. This collection of spirited articles targets such films as *The Women* and *Sunset Boulevard,* and examines such personalities as Jane Fonda, Marilyn Monroe and French director Marguerite Duras *(Holmes & Meier, NYC, $44.50).*

The nature of cinematic enjoyment generated by women's screen images is explored by Laura Mulvey in **Visual and Other Pleasures.** Sexual symbols in films by Godard, Fassbinder, Kubrick and British avant-garde filmmakers illustrate Mulvey's socio-political approach to eroticism *(Indiana U. Press, Bloomington, $35/12.50).*

Sigmund Freud's exasperated question, "What do women want?", serves as an epigraph to Heidi G. Dawidoff's well-meaning survey, **Between the Frames.** It praises the depiction of male/female relationships in films of the 30s and 40s, but finds some merit in those of the more inhibited of today's realistic movies *(Archon Press, Hamden, CT., $24.50).*

In **Hidden Cinema,** James C. Robertson documents the functioning and influence of British film censorship between 1913 and 1972, stressing such notable cases as *Battleship Potemkin* and *A Clockwork Orange (Routledge, NYC, $58).* Paul Swann, in **The British Documentary Film Movement 1926–46,** charts the genre's role as a leading alternative to commercial production and philosophy *(Cambridge U. Press, NYC, $39.50).*

An expanded edition of Tino Balio's classic report, **United Artists,** updates the history of a major motion picture company and its part in the shift from the old studio system to the modern version of independent production and distribution *(U. of Wisconsin Press, Madison, $32.50).*

Emblematic themes of societal and religious significance in Japan's commercial cinema are analyzed in Gregory Barrett's **Archetypes in Japanese Film.** This well-researched study attributes the slow change in traditional movie characters to evolving popular sentiments *(Susquehanna U. Press, Cranbury, CT, $47.50).*

Celebrating a cinematic milestone, **The Wizard of Oz: The Official 50th Anniversary Pictorial History**

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covers the saga of its production in an appealing, superbly illustrated volume by John Fricke, Jay Scarfone and William Stillman *(Warner, NYC, $29.95).* A reissue of Aljean Harmetz's **The Making of The Wizard of Oz** documents in fascinating detail the film's 2-year production travail. In **The Wizard of Oz: The Screenplay,** Noel Langley, Florence Ryerson and Edgar Allan Woolf – three of the ten writers who worked on the film – assemble the full-length script of the classic movie *(Delta, NYC, $12.95 and $9.95).*

A witty and nostalgic evocation of the cinema that was, Jerome Charyn's **Movieland** sees modern Hollywood as a symbol of this country's disorder, a retreat from the Great American Dream Culture that once nurtured our national character and mythology *(Putnam, NYC, $21.95).*

Avant-garde films as a criterion for defining concepts of cinematic meaning propel Peter Gidal's polemical treatise, **Materialist Film.** Clarified are the technical and stylistic features of experimental cinema's innate paradoxes *(Routledge, NYC, $16.95).*

Long the victims of studio neglect and disdain, screenwriters summon, in **Backstory,** their bittersweet memories of Hollywood's Golden Age. Edited by Pat McGilligan, interviews with James M. Cain, Philip Dunne, Donald Ogden Stewart, Casey Robinson and others revive the period's mixed mood of frustration and hope *(U. of California Press, Berkeley, $12.95).*

Performance technique, the actor's basic contribution to film, is knowledgeably appraised by James Naremore in **Acting in the Cinema.** He develops a method for analyzing performance and reveals the ideological implications behind various approaches to acting *(U. of California Press, Berkeley, $24.95).*

Notorious promotional gimmicks and stunts, concocted to fill theaters, are entertainingly recalled by Mark McGee in **Beyond Ballyhoo.** It's a mixed bag of tricks from outrageous hoaxes like Hypno-Vista and Emergo to legitimate endeavors like 3-D and CinemaScope *(McFarland, Jefferson, NC, $25.95).*

In **The Cosby Wit: His Life and Humor,** Bill Adler pens a biographical account of Bill Cosby's inner-motivated drive to overcome discouraging hardships and achieve popular success *(Morrow, NYC, $6.95).*

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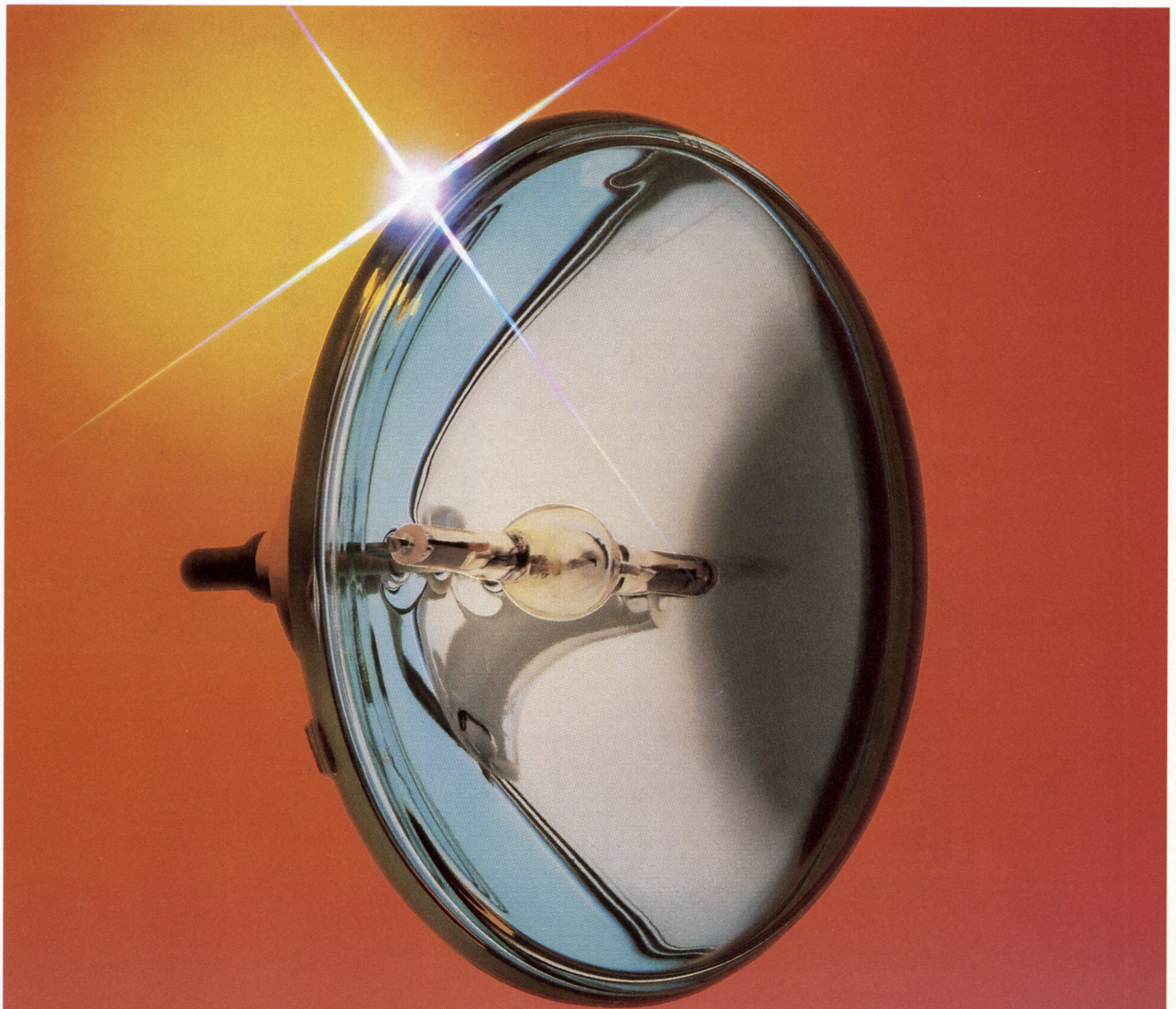

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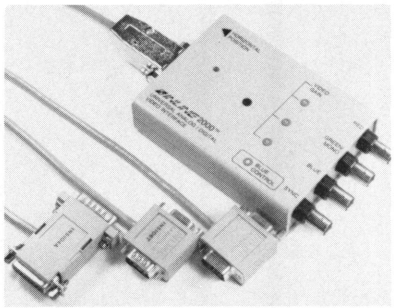

Video Interface

Inline's IN2000 Universal Analog and Digital video interface is designed to provide the complete solution for connecting your computer to a large screen projector or monitor. IN2000 is fully automatic and will adjust to many computer video signals. Just by changing input cables you can connect IBM PC, EGA, CGA, PS/2 VGA, Apple, Mac, or Mac II computers to a compatible projector of your choice. IN2000 will accept Analog, Digital or ECL video signals, composite or separate sync, sync on Green or any other video signals produced by different computers.

For more information: Inline, Inc., La Habra, CA, (800) 882-7117 or (213) 690-6767.

WD-40: Film Lubricant?

The owner of a 15-year-old film preservation and restoration company in North Hollywood has discovered a two-step method for lubricating and protecting film using a common household product. Gunther Jung, a 36-year veteran of the film industry and owner of Pix-Fix, Inc., claims that WD-40, the familiar lubricant in the blue and yellow can, is the film industry's newly discovered star.

"We have always used WD-40 for common tasks such as loosening bolts. Then one day it hit me: why not apply it to film? In our business most companies use 'edge wax' (an industry term used to describe a wax or oil solution that is applied to the edges of film strips for lubrication). The primary drawback with edge wax is that it requires a special waxing apparatus which is time-consuming and awkward to operate," said Jung.

"I applied WD-40 to the edges of the film and found that it lubricates the outer edges of the film to facilitate smooth travel through a projector. Moreover, it's simple. Sometimes the best solutions are the least complicated."

Jung suggests the following two-step method:

1. Place the film on a reel.
2. Spin the reel while applying a light coat of WD-40 to the film's outer edges.

"WD-40 dries quickly leaving behind a steadfast lubricant without build-up," said Jung.

Les Paul Robley, a projectionist for Cineplex-Odeon Theatres and another WD-40 advocate, has conducted technical research in process photography for 10 years. He earned a Technical Achievement Award at the 1988 Academy Awards for his work in dual screen front projection process photography – a process by which actors or props can be placed inside a projected background image (for example, an actor can appear to be walking around objects inside a spaceship when, in fact, the spaceship interior is nothing more than a painting projected onto a large front projection screen).

"I decided to test WD-40 on film after hearing about it from Gunther Jung," said Robley. "I found that WD-40 is indeed an effective film lubricant. It dries quickly, and as film is fed through the projector gate, the film is quieter, it stops chattering, and WD-40 prevents dry film from jumping."

For more information: WD-40 Co., P.O. Box 80607, San Diego, CA 92138.

8mm Camcorder

Ricoh is introducing its new top-of-the-line camcorder, the R-850, a standard 8mm model with an 8X power zoom. Other

hallmarks of this compact camcorder are two macro focus modes – "telemacro" and "wide macro," the ability to superimpose 4 digital titles, noiseless still and slow motion, plus in-camera editing features.

The 8X power zoom with manual override features an F/1.4 8.5 to 68mm lens that gives the user a broad range of shooting capabilities, from panoramic wide-angle shots to detailed close-ups. In telemacro, the lens focuses either automatically or manually from 27.5 inches to 41 inches for superb close-ups of featured players or subjects. In the wide macro mode, focusing is possible as close as 1 cm (0.4 inch) for ultra-close objects such as nature subjects – flowers or insects – with detailed accuracy.

For more information: Ricoh, 155 Passaic Ave., Fairfield, NJ 07006.

Crystal Control Unit

With this unit, Crystal Speed is attained in a fraction of a second after starting and is maintained within 1/20th of a frame in a full 400 foot roll at normal temperature, or within 1/8 of a frame in 100 ft under extreme conditions. An internal fine trimmer is provided for recalibration if ever required, without costly component replacements. There are no user controls.

A sync warning light illuminates if camera speed does not equal divided crystal frequency for any reason, such as weak battery, film jam, incorrect camera mode.

Rugged construction features die-cast aluminun alloy case, fiberglass cir-

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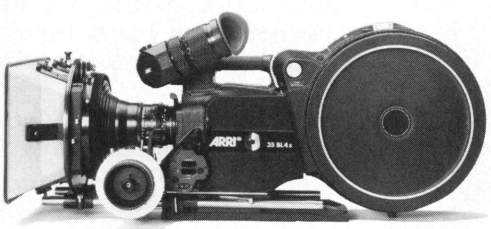

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For more information: Tobin Cinema Systems, 3227 49th Avenue SW, Seattle WA 98116 USA.

New Car Mount

Cinekinetic has released its new car mount called Cine-Saddle, that molds itself to the shape of any cine and video camera.

Encased in high strength, water resistant canvas and weighing only four pounds, it is the lightest car mount available in the world. Using specially designed clips and anchors, the Cine-Saddle can be attached to the hood, trunk, windshield or side windows of any car by one person unassisted in less than two minutes.

The Cine-Saddle has a breaking strength much greater than the stresses a camera and mount on a moving car travelling at legal speeds would ever be subjected to.

The Cine-Saddle can be positioned on the floor, a chair, a dresser, or atop a step ladder. In fact it can be used in any location imaginable – even inside an oven, refrigerator or sink.

For more information: Cinekinetic, P.O. Box 73063, Las Vegas, NV 89170; Telephone (702) 731-4700.

Software and Form Catalog

A comprehensive book of forms and new computer software are now available for film/videotape professionals and students. They can take any production – television commercial, feature film, documentary or even music video – from storyboard start to editing finish.

Two Florida filmmakers, active in the international film and television industry, have published 101 Film Forms and Movie Budget, available in print or on disk.

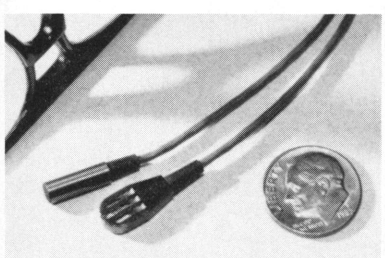
101 Film Forms fills 195 pages with forms and industry references. The forms include the exotic – The Ten Commandments of Aerial Cinematography – and the mundane: call sheets, make-up continuity, wardrobe breakdown, lab work order, picture vehicle log, prop inventory and meal check-off, among others. References include film commissions, studios, unions, guilds and organizations.

Movie Budget is a spreadsheet template, with self-calculating totals that can be adapted to each production's unique needs. More than a thousand entry lines can handle low- or high-budget shoots.

101 Film Forms covers all departments: 14 forms for production, 18 for assistant directors, 20 for camera, sound and grip/electric, 12 for casting, 10 for transportation and locations, and 11 for accounting. Art, wardrobe, hair and make-up – "the beauty shop" – have 15 forms.

Complex issues such as insurance also are addressed. A primer outlines terms for film coverages, as well as errors and omissions, and lists completion guarantors. Sample contracts, invoices and deal memos are included.

For more information: Indian Key Film Software, Inc., P.O. Box 53-1241, Miami, FL 33153.



Lavalier Microphones

Audio Intervisual Design has introduced two new microphones, the COS-11 tube type and COS-12 flat lavalier microphones.

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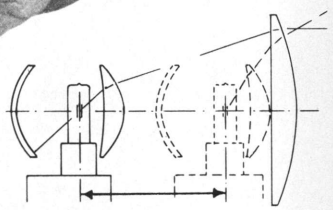

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Denmark	Poul Zimmermann, Borgergade 16, DK-1300 Copenhagen	tel. (0)1-93 97 50
France	Dimaphot, 16 Rue Clement-Marot, F-75008 Paris	tel. (0)1-47.23.98.87
Great Britain	Telefex, 58 Kew Road, Richmond Surrey TW9 2PQ	tel. (0)1 1940 11 55
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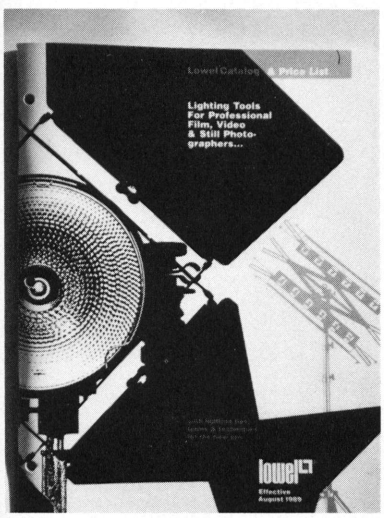
For more information: Audio Intervisual Design, (213) 469-4773.



Enlightening New Catalog

According to Lowel, the design and completion of a totally new lighting catalog is just as challenging as a new lighting system. The handsome, seventy-two page free "book" which took three years to produce, includes more than three-hundred and fifty photos, one-hundred drawings and comparative charts, extensive *Tips for Newpros* and a four page glossary entitled *Terms of Enlightenment.*

The Catalog also breaks new ground by assigning to every Lowel fixture an f stop rating (plus foot candle, lux and beam angles). While the f stops are not intended as a substitute for exposure readings, they can help relatively inexperienced professionals estimate the number and type of lights, distances and film or shutter speeds needed for anticipated set-ups.

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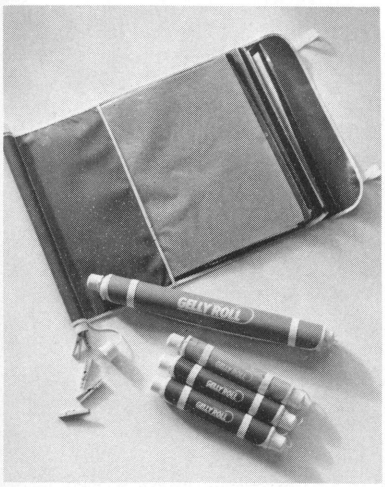
For more information: Lowel, 140 58th Street, Brooklyn, N.Y. 11220, (718) 921-0600.



"Gelly Roll"

Gelly Roll, a compact, handy way to protect lighting gels and diffusion media, is now available from Visual Departures, Ltd., a manufacturer and distributor of innovative professional photographic products.

Gelly Roll makes it simple to keep on hand a variety of gel sheets without the worry of damage or dirt. The gels are protected by a specially designed nylon canvas pouch wrapped around a hollow PVC tube. This rigid center tube protects gels from sharp bends and crushing, and provides a perfect storage space for gel clips. The Gelly Roll fits conveniently into a lighting case for easy transport.

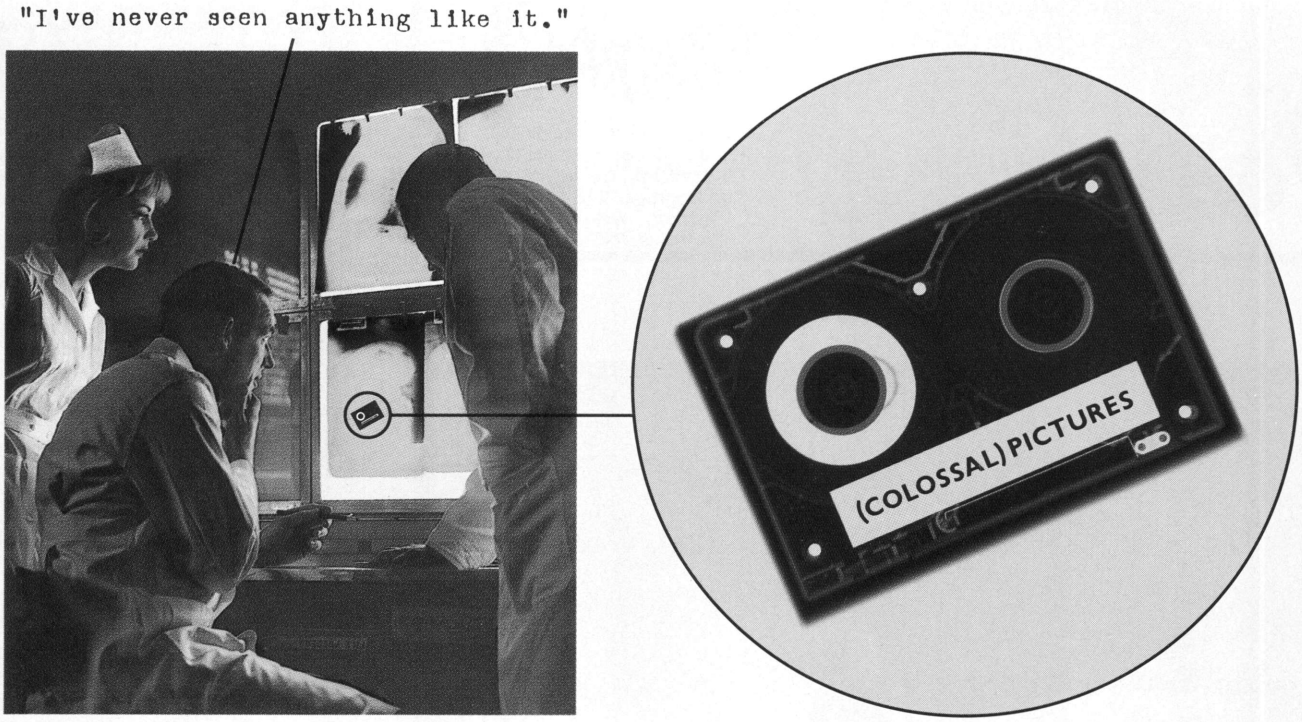
It is available in two models for different sized gels, and can easily hold up to 20 single sheets. Finding a specific gel is simple because the pouch unrolls to display the complete set. Elastic closures allow easy opening and closing – no string ties or buckles.

For more information: Visual Departures, Ltd., 1641 Third Ave. Ste. 202, New York, NY 10128. (212) 534-1718.

Light Control System

Honeycomb Lighting Products introduces Lightcomb, a revolutionary light control system featuring aerospace material technology.

A Lightcomb device enables cinematographers and lighting directors to



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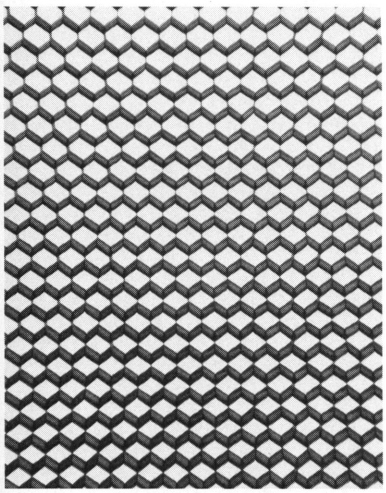
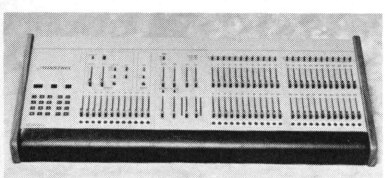


use softlights or large soft light sources and control the degree of "softness" and control the size of the pattern. By eliminating unwanted spill light, the Lightcomb system also eliminates the common time-consuming process of setting large flags and cutters to "cut" or control soft light. A lightcomb device can also be "feathered" easily during action in order to maintain the same light level on a subject approaching the light source.

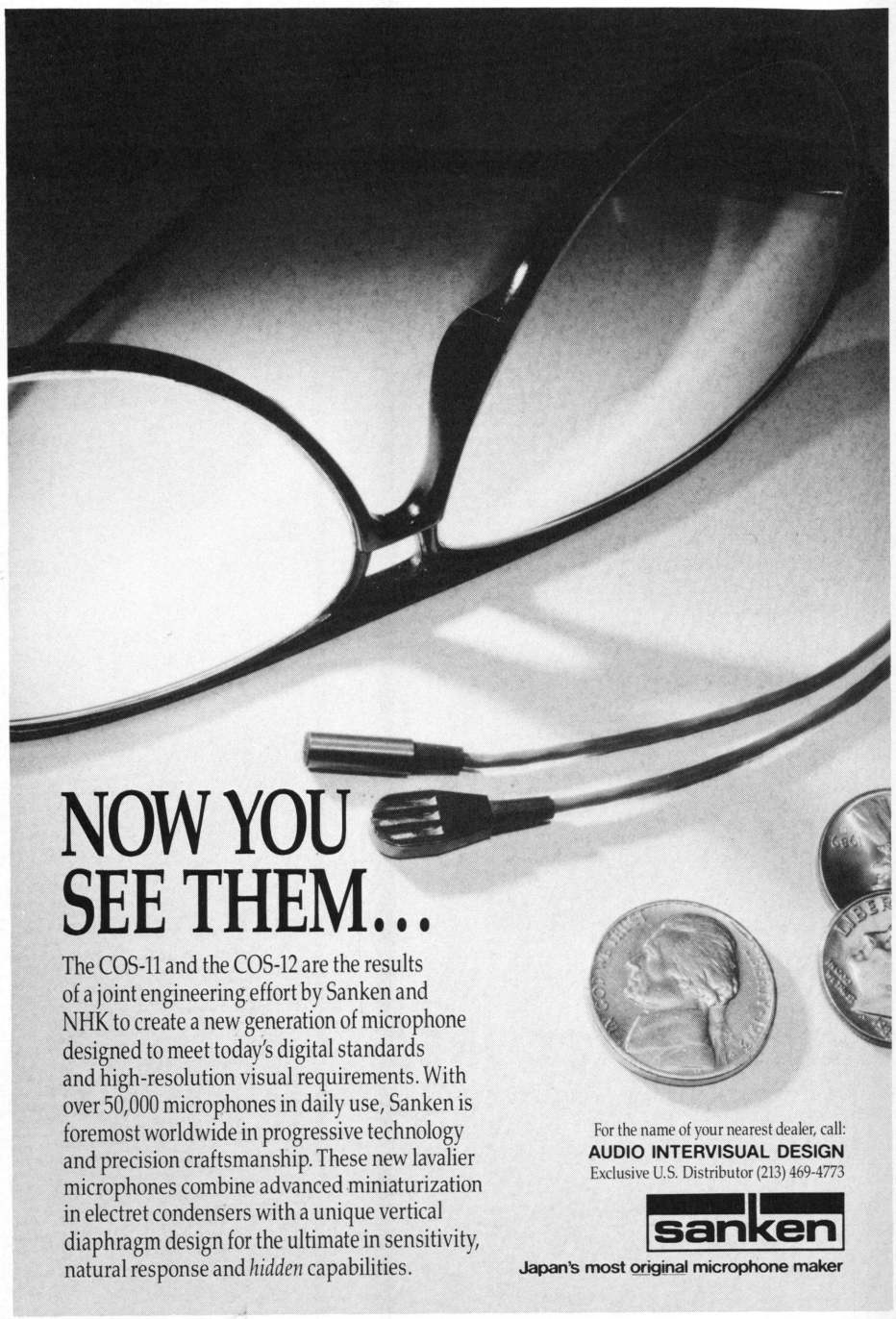
The Lightcomb system is available in various sizes. A 2′ x 2′ size is framed and attached to a standard 5/8″ spud for mounting on a century stand. A 4′ x 4′ size is framed and attached to a swiveling yoke which can be aimed and then locked into position. Lightcomb "eggcrates" for softlights have also been designed to replace conventional eggcrates when more directional light is desired.

For more information: Paladin Cine Rentals, 7356 Santa Monica Blvd., Hollywood, CA 90046, (213) 876-7750.



Control Console

The Minstrel Control Console operates as either a two-scene manual or memory controller. It can control up to 512 dimmers with up to 48 control channels, and includes X/Y crossfaders, blackout switch and independent master with timers. The console supports USITT DMX-512 digital multi-plex protocol, with analog output available.



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The Minstrel special-effects option features 12 full inhibiting submasters with 36-cue memory and blind recording capabilities. Other options include proportional soft patch and houselight control module.

For more information: Electronics Diversified, Inc., 1675 NW 216th Ave., Hillsboro, OR 97124, (503) 645-5533.

CCD Lenses

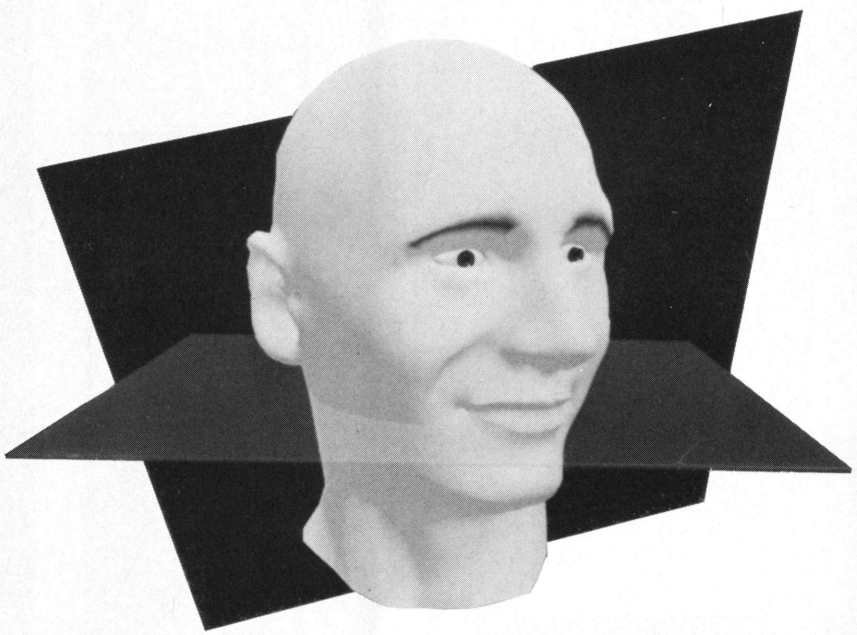
A new line of high performance lenses for 2/3 inch and 1/2 inch CCD camera has been introduced by Schneider Corporation of America. The new lenses have been color corrected in the near infrared, as well as the visible spectrum. This permits the user to take advantage of the sensitivity of CCD chips in this area. Since conventional lenses are not color corrected in the near IR range, sophisticated users of CCD cameras have used filters to remove infrared energy so as to achieve maximum sharpness. When used with incandescent sources, which produce substantial energy in the near IR region, these lenses can allow the user to achieve increased sensitivity of as much as two f-stops.

These lenses have been optimized and color corrected for CCD cameras, and permit imaging in the range from 400-1060nm (nanometers). These lenses also feature improved uniformity of illumination and increased modulation.

The new lenses include Cinegons, with focal lengths from 4.7mm to 12mm, Xenoplans with focal lengths from 17mm to 35mm, and a Tele-Xenar 70mm lens.

All of these lenses are available with manual iris, or with motorized iris, and with video signal control. The motorized and video signal control lenses have a maximum mechanical diameter of 52mm, and therefore fit easily into small housings.

For more information: Schneider Corporation, 400 Crossways Park Drive, Woodbury NY 11797. ▲



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For further information contact the Montréal Film Commission
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Fax: (514) 872-1153

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BUREAU DU CINÉMA MONTRÉAL FILM COMMISSION

Ville de Montréal

The Alan Gordon Year-End Sale

Products & Prices for Today's Filmmakers

70mm CAMERAS

	Sale Price
70mm Mitchell FC, Body Only, rackover, 4 Perf, ASA 1	$22,500.00
70mm Mitchell FD body only, 10 Perf ASA 1	$10,500.00

35mm CAMERAS

35mm Mitchell GC Camera Body, completely rebuilt & repainted	$9,500.00
35mm Mitchell R35 Mark II w/Video Prism, 115V AC Sync Motor, Matte Box, Follow Focus 2-1000' Mags, cables & cases	$19,500.00
35mm Mitchell BNCR w/Xtal Motor, 2-1000' Mags	$9,995.00
35mm Mitchell BNC w/220V Sync Motor, 38 X 155mm Pan Cinor Zoom Lens w/Reflex Finder, 2-1000' Magazines, cable & cases	$5,500.00
Arri 35 BL-I Updated w/Electronic Counter, Universal Prime Lens Hsng, cable & case, 2-400' Magazines, AGE Rental Camera, very well maintained	$45,000.00
Arri 35 BL II w/Electronic Counter, Universal Prime Lens Hsng, cable & case,2-400' Magazines, AGE Rental Camera very well maintained	$65,000.00
Arri 35 IIC BNCR Hard Front, w/2-400' Magazines, Constant Speed Motor w/cable	$7,500.00
Arri 35 IIC BNCR Hard Front w/2-400' Magazines, Cosmovision door cable & case, exc cond	$10,500.00
Arri 35 II BV Camera Body w/Constant Spd Motor & cable	$2,995.00
Arri 35 II BGS Camera Body w/Constant Spd Motor & cable	$2,995.00
Arri 35 II B Camera Body w/Constant Spd Motor & cable	$2,495.00
Eclair 35mm Camerette, 4 ea Kinoptik Lenses, 24V. motor,1-100' & 2-400' Magazines	$3,495.00
B & H Eyemo 3 lens turret motor mnt , exc crash camera	$1595.00
B & H Eyemo Single lens turret motor mnt	$995.00

16mm CAMERAS

16mm Mitchell w/Matte Box & Finder, 15, 25, 50, 100mm Baltar Lenses, 4- X 400' Magazines, 2-16 X 1200' Magazines, 24VDC 48-144 fps Motor, 115VAC 48-144fps Motor, 115VAC 8-32fps Motor, 6-cases Exc cond-a great package	$12,500.00
16mm Mitchell camera, Body only	$7,500.00
NPR Camera 3 ea 400' Mags, Ciblo Motor Orientable Finder, Ang,12-120mm Zoom, Cable and Case	$4,500.00
NPR Camera, Orientable Finder, Ciblo Motor, 2 Mags, Cable and Case	$2,995.00
Arri 16 S Body Only	$1,495.00
Arri 16 SB Body Only	$2,495.00
Arri 16 SB w/ Constant Speed Motor	$3,495.00
Arri 16 SB/GS w/Constant Speed Motor	$3,995.00
16mm Underwater Housing with MiniCam-16 Gun camera, 13mm lens, complete ext controls	$1,495.00
CP 16RA New Package w/AMP & Mag Head, 9.5 to 57 Angenieux Lens, 2-Batteries and Chargers, 2-PLC4A Magazines. Reg Price $22,161.00 Now	$11,500.00
16mm Pathe Professional Reflex w/25mm 0.95 ANG. lens like new	$995.00
16mm Pathe Prof. Reflex, body excellent	$695.00
16mm ACL w/2-400' Mags 15-150mm Ang Zoom Lens cable, new batt & charger, Barney, exc cond	$6.995.00
Acme Mdl 6 16mm Animation Camera, complete w/Var. Speed Acme Stop Motion Motor Lens in Focusing Drum, Dissolve Mechanism, Reflex Fndr, completely overhauled incl. movement, excellent condition	$18,500.00
Bolex 16mm E L Camera w/Arri to "C" Mnt. Adapter, Pistol Hand Grip, Power pack w/Chgr, Sync, Cable, complete package, like new	$3,800.00
Bolex 16mm EBM Body w/Power Grip Only	$1,295.00
Bolex Rex 5 w/MST motor, 400' Mag. take-up motor, batt & charger	$2,495.00
Beaulieu R16 Body Only,	$295.00
Beaulieu 16mm Reflex Spring Wound Camera w/3 Lens Turret & 1" Lens, very good	$395.00
Canon Scoopic 16 w/Zoom Lens, battery, needs charger	$250.00
Kodak K-100-3 Lens Turret Camera w/25mm 0.95 Angenieux Lens & Fnd. Objective	$695.00
K-100 Kodak Camera w/1" Lens, very good (excellent for underwater housing)	$395.00
Kodak Cine Special II w/Misc. Lenses, w/1-100' Magazine & 1-200' Magazine	$495.00
Milliken DBM 4A (128-400fps) w/9.5 to 95mm Angenieux Lens, 7 1/2 Viewfinder, 110VAC w/Cable	$3,995.00
Milliken DBM 55 16mm Vari hi-speed (10-500fps) single lens "C" mnt turret. Compact co-axial 400' internal film capacity, 28 VDC, pin reg. indust or commerc. cam. New value $10,000. Sale	$6,500.00
16mm Bell & Howell 70 HS 128fps, w/24V Motor, 400' Magazines, excellent	$1,845.00
Auricon (Single System Sound Camera) Pro-600 w/MA-11 Amplifier & 1-600' Mag,	$495.00
Auricon PRO-1200 w/TVT Shutter MA-11 Amplifier, 2 ea 1200' Magazines cable & cases	$895.00
Auricon PRO-1200, MA II Amplifier 2 ea. 1200' Magazines, cable and case, extra magazines available	$795.00

The above Auricon cameras sold as is, w/out warr. implied or expressed. They can be used as double system cameras, as they are self blimped w/synchronous motors and noiseless.

16mm SPECIAL CAMERA PACKAGES

Arri 16S Camera complete w/16, 25, & 50mm Schneider Prime lenses vari-speed motor, matte box cable & case. Arriflex & A-G-E Technicans estimate that less than 100' has gone through the camera. As New. Complete package..	$4,995.00.
400 FT Magazines w/torque motors are available.	
EK Cine Special II w/two 100' Magazines, one 200' magazine, 15, 25, 50, 63, 102, 152mm Ektar lenses with matching viewfinders for all lenses in original case. All items look brand new, complete..	$2,495.00
Kodak K100T w/15, 25, 63mm lenses including finder objectives, also has a C-mount adapters & finder objectives for 102 and 152mm Ektar, complete package including original case, brand new cond	$1,595.00
Special Time Lapse Package, Includes Environmental Housing with heater and cooling fan; Intervalometer (timer), Control box for remote control and switching functions of the motor drive unit, 16mm Mitchell "Professional" Camera with 400 ft Magazine, Prime Lens and Stop Motion Motor Drive Unit, Ready to shoot	$13,500.00
16mmPhoto Sonics Actionmaster 500, 1-400' Magazine, 12 to 120 Canon macro zoom, pistol grip & shoulder pad, Orientable viewfinder & cable, .	$12,500.00

MAGAZINES

Arri 16 X 400'	$425.00
Auricon 16 X 600'	$125.00
EK Cine Special 16 X 200'	$150.00
EK Cine Special 16 X 100'	$50.00
N9 Gun Camera 16 X 100	$495.00
Auricon 16 X 1200	$295.00
Mitchell 16 X 1200	$695.00
Kodak Reflex 16 X 400	$249.50
Mitchell 16 X 400	$295.00
B & H 16 X 400	$249.00
Arri 16 BL 16 X 1200' Mag	$1,200.00
Eclair NPR 16 X 400	$695.00
Arri 35 X 200	$595.00
Cineflex 35 X 200	$199.50
Eclair camerette 35 X 400	$249.50
Automax 35 X 200	$195.00
Mitchell 35 X 400' slantback	$225.00
Mitchell GC 35 X 400	$495.00
B & H 35 X 400'	$295.00
Mitchell Std. 35 X 1000	$395.00
Mitchell NC 35 X 1000	$495.00
Arri 35BLI 1000'	$3,995.00
Mitchell 70mm X 400'	$795.00
Photo Sonics 70mm X 400'	$495.00
Benson Lehner 70mm X 400'	$695.00
Hulcher 70mm X 400'	$300.00
Mitchell 70mm X 1000	$1,195.00
Benson Lehner 70mm X 1000	$895.00
Photo Sonics 70mm X 1000	$795.00

35mm PRIME LENSES

100mm Schneider Xenon Arri Std Mount	$695.00
400 mm Omnitar Arri Std Mount	$395.00
800mm Astro Berlin F4 5 Arri Std Mount	$595.00
1000mm Omnitar F4 5 Arri Std Mount	$2,995.00
50mm Miltar T2 3 Eyemo Mount	$200.00
75mm Miltar T2 3 Eyemo Mount	$200.00
100mm Miltar T2 3 Eyemo Mount	$200.00
100mm Baltar T2 5 Eyemo Mount	$200.00
250mm Miltar T4 6 Eyemo Mount	$250.00
24mm Zeiss Distagon Arri Std Mount	$1,295.00
32mm Zeiss Planar Arri Std Mount	$1,195.00
40mm Schneider Xenon Arri Std Mount	$495.00
50mm Schneider Xenon Arri Std Mount	$495.00
50mm Zeiss Planar Arri Std Mount	$895.00
40mm Kinoptik Arri Std Mount	$595.00
50mm Baltar Arri Std Mount	$395.00
75mm Schneider Xenon Arri Std Mount	$495.00
85mm Zeiss Planar Arri Std Mount	$895.00
9.8mm F1.8 Kinoptik w/filter Slot Arri Std Mnt.	$1,995.00
9.8mm F1 8 Kinoptik Arri Std Mount	$995.00
18mm Schneider Xenon Arri Std Mount	$695.00
28 mm Schneider Xenon Arri Std Mount	$495.00
35mm Schneider Xenon Arri Std Mount	$395.00
40mm Schneider Xenon Arri Std Mount	$395.00
50mm Schneider Xenon Arri Std Mount	$395.00
75mm Schneider Xenon Arri Std Mount	$395.00
100mm Schneider Xenon in Arri Std Mount	$595.00
40mm Kinoptik Arri Std Mount..	$495.00
50mm Kinoptik Arri Std Mount..	$495.00
90mm Macro Kilar, Arri Std. Mount	$395.00
80" Wollensak Mirrotel in Arri Std. Mount.	$495.00

35mm ZOOM LENSES

60-240 Pan Cinor w/Finder BNC Mount.	$1,995.00
38-155 Pan Cinor w/Finder BNC Mount.	$1,995.00
28-280 Zolomatics (Fujinon Glass) Arri Std. Mount.	$2,495.00
25-250 Angenieux Arri or BNCR Mount.	$2,995.00
20-120 Angenieux Arri or BNCR Mount.	$5,495.00

16mm ZOOM LENSES

17-70 Pan Cinor Arri Std. Mount.	$99.00
17-70 Pan Cinor Arri Std. Mount.	$295.00
17-85 Pan Cinor Arri Std. Mount.	$395.00
12 to 120 Angenieux Zoom Lens RX Mnt. for Bolex	$1,295.00
12 to 120 Canon Macro-Zoom	$1,750.00
12.5 to 75 Angenieux Zoom Mount. 1	$895.00
10 to 150 Angenieux Zoom Arri B Mnt. excellent	$2,495.00
9.5 to 95 Angenieux Zoom Arri B Mnt., excellent	$1,795.00
12 to 120 Angenieux Zoom Arri B Mnt., like new	$2,195.00
12 to 240 Angenieux Zoom Arri B Mnt., excellent	$4,975.00

"C" MOUNT LENSES

5.9mm Angenieux f1.8	$1,800.00
125mm Trinitar f1.4 new	$400.00
125mm Cosmitar f1.4	$175.00
13mm Soligor f1.5	$100.00
15mm Angenieux f1.3	$195.00
15mm Nominar f1.4	$125.00
25mm Kaligar f0.95	$175.00
25mm Angenieux f0.95	$495.00
25mm Soligor f0.95	$175.00
25mm Trinitar f1.4 new	$350.00
25mm Fujinon f1.4	$175.00
50mm Canon f1.4 new	$225.00
50mm Cooke f1.4	$195.00
50mm Trinitar f1.4 new	$315.00
75mm Angenieux f2.5	$225.00
75mm Kinotar f2.5 new	$310.00
100mm Elgeet f2.7	$200.00
100mm Cooke f2.5	$250.00

Ask about our large stock of "C" mnt lenses in various focal lengths, brand names and f stops at bargain prices

MOTORS

Mitchell 16 Variable Speed Motor	$595.00
Mitchell 16 Hi Speed Motor	$795.00
Mitchell 35GC Variable Speed Motor	$595.00
Mitchell 35GC Hi-Speed (128 fps) Motor	$895.00
NCE III A-G-E Animation Motor w/Adapter for GC (includes cables & controls) new	$2,145.00

• ***All Equipment is USED unless otherwise stated***

The Alan Gordon Year-End Sale

Products & Prices for Today's Filmmakers

MISC. CAMERA ACCESSORIES

Sale Price

Arri 35BL 20-120 Lens Housing $2,250.00
Arri IIC Metal Matte Box, like new $189.50
Mitchell View Finders 16 or 35mm $399.50
Mitchell BNC 'Matte' Punches $295.00
New A-G-E Arri Bridge Plate w/rods $695.00
Arri IIC "Cosmovision" Bright Door $1,295.00
AGE 35 Arri Hi-Hats used. $59.95
AGE 35 Arri Hi-Hats new $125.00
AGE 35 Mitchell Hi-Hats new $125.00
AGE Pro Jr. Hi-Hats new.. ..... $125.00
AGE O'Connor 50 Hi-Hats new $125.00
AGE 150mm Ball Hi-Hats new $125.00
AGE 100MM Ball Hi-Hats new $125.00
Sachtler 150mm Ball Hi-Hats.new $85.00
Tekskil Camera Prompter w/909V cam Mnt Viewer, Ikegami PN930-9" monitor, 909T test transport table $6,300.00
Panasonic WV1410 Vidicom script cam and cases
Tiffin Filters, 4 1/2" 85BN 3,6,9. new. Reduced from $100 .... $55.00

DOLLIES, TRIPODS, GRIP

Argus Compact Dolly complete with Super Structure, Pneumatic wheels, short or long riser, 150mm Ball adapter, two seats w/vert or horiz extensions, steering handle & key. This new package also incl. 40" Mini-Jib Arm w/telescopic bal. mech, tilt limiting adjustment. Superb buy $14,950.00
Moviola Crab Dolly, very good $8,500.00
Elemack Spyder Dolly w/Bogie Wheels, completely overhauled to factory specs, Exc. cond $12,500.00
Elemack Spyder Dolly serviced $10,000.00
Colortran Mini Crab Dolly/rebuilt , exc. cond $6,500.00
Colortran Mini-Crab Dolly, exc cond $4,850.00
Ronford F2 Fluid Head w/legs $895.00
Arri "Cartoni" Gyro Head w/legs $895.00
Mitchell Counter Balanced (weighs approx. 120 lbs) "Triangulation Camera" Head, like new $595.00
O'Connor "C" tripod head $595.00
Matthews French flag. New orig $64.00 now $54.00
Matthews 40" 2-riser "C" stand. New orig $155.00 now $132.00
Matthews Grip head w/arm. New orig $73.50 now $62.00

FILM MOVEMENTS

35mm Mitchell Std. $1,995.00
35mm Mitchell GC Hi-speed, excellent $4,995.00
35mm Mitchell GC $3,795.00
35mm Mitchell Single System very good $3,995.00
35mm Bell & Howell Std. (2709) Hi-speed $595.00
35mm Wall Single Perf. $795.00
35mm Wall Double Perf. $895.00
16mm Benson Lehner Movement complete w/Variable Shutter & Timing Light Block Assembly $3,495.00
70mm Cinerama Pin Registered Movement $3,750.00
Richardson Viewer and Projection Movements:
TS-35-B 4 perfs, max spd 24fps. $1,950.00
VF-35-A 4 perfs, max spd 24fps.. ..... $2,995.00
35-4-BH 4 perfs, max spd 24 fps.. ..... $2,886.00
TSR-35B 4 perfs max spd 24fps $1350.00
CL-16-1-1L 1 perf, max spd 24fps $2886.00
Mitchell 70mm Feed Sprocket Assby $395.00
Bell & Howell Adjustable Pin Registered 35mm Printer Movement (old style) as is $795.00

35MM PROJECTORS

(1 Pr.) MP/30 35mm Projectors, with heavy-duty pedestals, 500W Xenon Lamphouses, Changeover .. $12,995.00
(1 Pr.) Simplex XL 35mm Projectors, w/Forward & Reverse, RCA Mag/Optical Interlock Sound Heads, Electric Changeover, Motorized 2000' Take-up Magazines, Xetron 1600 w/Xenon Simplex Pedestals, Used $18,000.00
Century Model MDA 35mm w/Century Sound Head, Mdl MR-3-G, Pedestal, Rebuilt, Exc cond $4,450.00
Tower Film Transport, 2-hr. 40 min. Capacity $2,995.00
35mm Goldberg Booth Rewind $595.00
35mm MP 30 M Magnetic Interlock, double band proj. c/w 30 w. built-in amp. monitor speaker, 1000 W Quartz Lamp, lens, proj. stand & case $4.995.00
(1 Pr.) -1000 watt Xenon Lamphouses, XELAMP mdl 8510, reliable igniter and auto start circuitry, min 300 CFM cooling system. Used only 26 hrs. Pair $3,995.00
35mm Format Projection Lenses, varying focal length, New, discounted by 45-65%

16mm PROJECTORS

(1 Pr.) Norelco 16mm Pedestal Projectors w/2500 Watt Hughes Xenon Lamphouses, Solid State Power Supplies, Change-overs 1 1/2" Lenses 2 1/2" Lenses, Anamorphic Lenses, Used only 500 hrs. (New Replacement Cost $22,000.0) Now $9,950.00
1 JAN optical sound proj.reduced from $2,690.00 . ..... $695.00
1 EIKI MOD RST.Reduced from $1,570.00 Now $695.00
16mm Format Projection Lenses, varying focal length, New, discounted by 45-65%
Ask about our misc. projector units as is.. ..... $25.00

AUDIO EQUIPMENT

Nagra IV-S stereo with QSLS resolver. Exc. cond. $6,300.00
PS-3 Battery Power Supply for 12T mics. new, orig $190 ... $139.00
12 foot Fishpole Mic Boom with cable. new, orig $185. ..... $165.00
Audio Technica AT 835 shotgun. new, orig $430. ..... $240.00
Sony ECM-44 Lavaliers. new, orig $194.. ..... $159.00
Schoeps CMC4/MK41 exc cond.. ..... $875.00
Sennheiser MKH 406T.new $675.00
Swintek Mark 2L/50A Body Pac Wireless Mic System w/2L AC receiver, 50A BodyPac transmitter, antennas, case ...List $1,900.00 exc cond.. ..... . $450.00-$675.00
Swintek Mark 3/50 Wireless Mic System, VHF DC Receiver, Transmitter, Antennas, Case ...List $1,788.00 exc cond.. ..... . $450.00 - $675.00
Swintek 1L/SM58 Hand Held Wireless Microphone, w/Swintek AC/DC Receiver ...List $2,488.00 exc cond .... $550.00 - $750.00
Swintek Mark 200D Communication System, 5 units includes headsets ... List $6,600.00 Now. $3,000.00
Mini-mic Lavalier mics-assorted types from.. ..... $75.00 - $150.00

EDITING EQUIPMENT

Moviola K-20 16mm Motor Driven Viewer, New $6,185.00 Exc cond $595.00
Moviola L-20 16mm Motor Driven Viewer w/T.U. Arms, New $8,325.00 like new $895.00
Moviola 16 UL20S 1-Picture 1-Sound w/Take Up Arms, Console New $12,500.00 Now $1,495.00
Moviola 16 UL20CS 1-Picture w/Composite Snd 1-Separate Sound console model w/Take Up Arms, excellent condition New $14,850.00 Now. $1,795.00
Moviola 16 2 Picture Heads & Take Up Arms w/center Optical or Mag Track w/Track ,Take Up Arms, New $23,653.00 excellent buy at $2,995.00
1-UL-20 1-Picture, lge, screen, 2 seperate snd hds, Console w/3 sets Take Up Arms, New $16,286.00 very good condition $2,495.00
HFC 16/35 Negative Rewind, excellent $295.00
Gryphon Lab, Motorized Titewind w/Foot Pedal $325.00
Moviola 16mm 6 Gang Sync Machine w/Moviola Motor Drive, New $1,610.00 Used but in exc cond $495.00
Moviola SZD 16mm 4 Gang Synchronizer, New $805.00, exc condition $275.00
Moviola SZC 16mm 3 Gang Synchronizer, New $695.00, exc condition $520.00
Moviola SZA 16mm 1 Gang w/hrs. mins., secs, counter, New $720.00 exc condition $536.00
16mm Rivas-type Splicers, New $285.00 good condition $99.50
16mm Cutter lge. 16mm Picture Head w/seperate 16 Mag Track mntd on console $995.00
Moviola M-86-AH 16mm Flat bed editor, w/factory installed torque motors, six plates flickerless prism, optic/Mag, sound, Xtal controlled sound speed in exc condition. Also available for long term lease.If bought new $21,000.00. Sale price $9,995.00
Ciro 16mm M2-T2 tape splicer $295.00
Maier Hancock 8/16 hot splicer $375.00
Maier Hancock 16/35 hot splicer $695.00
16mm Zeiss moviscope viewer, re-built $375.00
Ecco MOD. D Film cleaner 16 or 35mm $99.50
Ask about our misc. rewinds, tight winds, shafts, core adapters.

LAB EQUIPMENT

16MM/35MM WET GATE SYSTEM for *Acme* Projector. Forward, reverse, stop motion, freeze frame, continuous/high speed to 500 fps, normal 240 fps. Fixed pin registration with threading latch for easy loading. Regulated pump-fed closed support system consisting of two pumps, reservoir, controls, valves, gauges, cabinetry. Complete system includes: 16MM & 35MM WET GATE for Acme & Support System. New:$22,450.00 Exc cond $11,000.00

PRINTERS: Acme Model 37 16mm Step Contact Printer. Designed for printing dupe negatives, color separations, master positives. Daylight operation Acme movement. Variable dissolve shutter. 16-128 frames. Prints edge numbers on either side of film, has automatic light and shutter controlling devices, variable speed sync motor for speeds of 1 1/2, 3, 6, 12, 16 and 24 fps Film capacity, 1200 feet. Rebuilt like new $35,000.00
Bell & Howell MDL 6100 CT Additive Color Printer Printer speed is 180/60fpm. One side edge light Only 40 hours of operation, Like new $19,500.00
Houston Fearless 16/35 spray processor B & W 18-150 FP,M in good condition $1,950.00

OPTICAL PRINTERS: A Special offering of currently in-service printers is available. Please call for prices on the following:
- ACME 103 optical FX printer w/Prism Proj.
- ACME 103 Optical FX printer w/aerial image proj.
- Lipsner/Smith Mdl II 16/35 ultra sonic film cleaner
- Research products 103 optical FX printer.

The 1989 Year-End Sale represents only a sample of our complete line of quality used and new motion picture equipment at Alan Gordon Enterprises, Inc. The equipment list is continually updated to provide the film professional with all the options for today's production needs. All equipment is on a first come, first served basis. To avoid disappointment, place your order today. Overseas enquiries are very welcome-we speak your language!

- **All Equipment is USED unless otherwise stated**
- **Prices FOB North Hollywood, California**
- **California residents add 6.5% sales tax**
- **All prices subject to change without notice**

alan gordon enterprises inc.
1430 CAHUENGA BLVD., HOLLYWOOD, CALIFORNIA 90078, USA
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Photos by Edgar Ladrone-de Guevara

Shrinking Kids Meet Giant Grass Blades

By Brooke Comer

Honey, I Shrunk the Kids was originally conceived as a low budget film, according to director of photography Hiro Narita. To insure the complex sets, special effects and high production values essential for a credible storyline, the film went to Mexico's Churobusco Studios, where the American dollar stretches farther.

Honey recounts the adventures of four children accidentally made miniscule by their father. Swept into a dustpan and thrown into the garbage, most of the action takes place as they fend off gigantic insects on their trek home across the lawn. These scenes required extensive footage amid giant scale grass. Narita faced some unusual challenges on the job; he had to light 35-foot blades of foam grass convincingly, and shoot with a crew whose language he did not speak, and whose lighting style was both technically and aesthetically different. Despite the unique demands inherent in shooting *Honey,* he approached the job with equanimity.

Narita is no stranger to unusual working conditions. Unlike some of his colleagues who shoot genre films with a specific director, the San Franciscan has worked in a variety of formats within the media. He studied graphic design and story illustration at the San Francisco Art Institute. Drafted in the mid 60's, he became an army designer, concentrating on graphs and charts. Cinematography did not beckon until later, when Narita apprenticed for an independent filmmaker, shot documentaries, still photography, designed posters, "and did just about everything."

Tom Smith, *Honey*'s executive producer, head of the blue screen and special effects units, and former manager of Industrial Light and Magic, hired him to shoot *Honey.* The cinematographer worked closely with both Smith and director Joe Johnston. "A lot of shots had to be printed and storyboarded so the special effects unit could shoot their parts of the images to match up to the live action."

Narita had never worked on such a heavily storyboarded film before; "in live action we'd have to improvise to get a certain camera angle, which was a new experience for me." He points out that "it can be dangerous to go with preconceived framing; if you fail to see something new that's in front of you and ignore it, it can be deadly in the end." He took the job knowing that "it was inevitable that the composition would be storyboarded, it was a client requirement. And though ordinarily in a situation like that, half the fun is gone, Joe Johnston was a fine storyteller and his choices of angles and images were very good." Narita also had some input in terms of angles.

When he was hired, Narita was told he could bring a

lighting gaffer and the rest of the crew would come from Mexico. This bothered him less than his lack of fluency in Spanish. "Language was a major problem. I don't speak Spanish. I'd also heard that Mexican cinematography is quite different, notably in the lighting department." But Narita had also heard that Mexico rigging crews were very good, "and I found that to be absolutely true. They were great at building dolly tracks."

Narita was encouraged when he heard that some of his Mexican lighting crew had worked on *Dune*, because he noticed that "in general, Mexican cinema does not call for subtle or interesting lighting, or the tools to regulate light, so there was a lack of expertise in that area." As a result, he had to familiarize crew members with nets and flags. "We also found that most of the lighting equipment down there was pretty old and I had to bring more than half of what we needed."

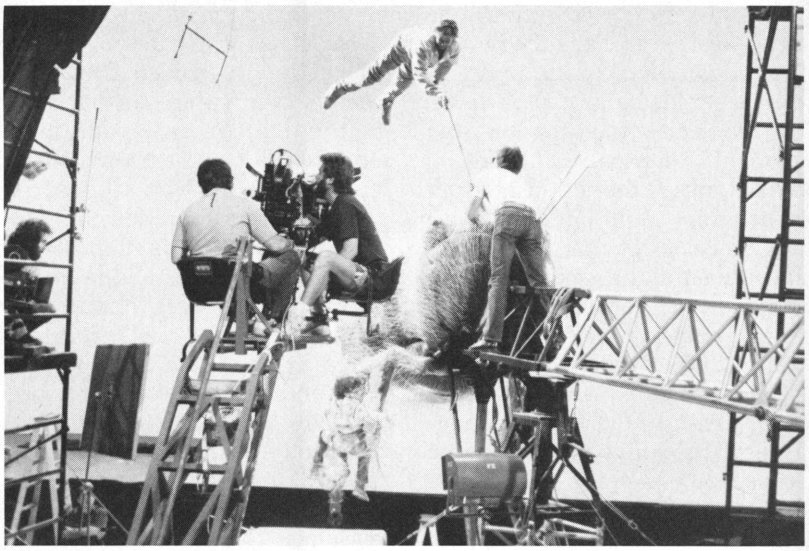
On the bright side, Narita and the Disney crew had no trouble bringing equipment through customs. The difficulties, like U.S. lighting techniques, were subtle. "The Mexican people in general were willing to do anything, which was heartwarming," Narita observes. "They built first rate sets, some giant mechanical ants and a mechanical bee." Narita even found one Mexican crew member who spoke English and had worked as a cameraman, "so he sort of knew what I was trying to do."

Set building was especially important since *Honey* was shot almost exclusively inside Churobusco, with only one or two exterior shots on a Mexico City street. Ironically, those scenes were most problematic. "We shot our outdoors scenes first," Narita explains. "In February we had a few incredibly – and unusually – clear days. With the city's high altitude, ultra violet rays are very strong and the film responds differently." After a week of outdoor shooting, the city's weather became "very contrasty again, which was an unfortunate problem I couldn't solve. Ultra violet is something you can't take out." Narita used UV filters, but because of the contrast he had to use a lot of fill light. "The air was so clean for that week or so and the sunlight was so brilliant that even if I had 10 arcs, I don't think I could do anything." Low contrast filters didn't create a satisfactory image. So when the air quality resumed its normal smogginess, he said, "in the same scene, you can see this incredible mis-match. We couldn't re-shoot half the exterior, because it would be too expensive, so there are some scenes at the end that suffer from that."

Narita usually works with an Arriflex, but shot *Honey* with Panavision to accommodate the special effects. "Apparently Panavision has a bit better film registration than the Arri," he notes. Though he'd used Panavision before, Narita's preference for Arri is predicated on the camera's compatibility with Zeiss lenses, "and because I'm used to the Arriflex. It's a little cheaper than Panavision. But I hear Panavision has been adapted now for Zeiss lenses." A Panavision representative in Mexico City supplied Narita with a camera. Half of the equipment, including lenses ("they were mostly hard lenses, and a short Cooke 5-1 zoom") came from Mexico.

Narita calls the use of different film stocks "one of the interesting aspects about this filming." Kodak 5247 was selected for its special effects capability and Narita was asked to use 94 high speed as well. "I then tested other stocks," he explains, "including Fuji, Eastman 5295 and 5294, and Agfa 320 XT." The last stock turned out to provide the best green for the backyard grass, so "we switched halfway through the shoot." Initially, most of the indoor scenes were shot with Agfa and the exteriors with 5247. "But green is a very difficult color to shoot," Narita explains. "It tends to go darker and drop off. When you're dealing with a set that's 100' by 100', even with massive lighting, the 47 didn't have the color latitude of Agfa, which responded to green better than any of the others." In special effects sequences, "I had to light with an increased amount

Illustrations, opposite page and below, show giant plant stocks and other obstacles created to 'shrink' the kids. Lighting challenges for Narita's camera were to keep the foam grass from looking phony as well as make all perspectives believable.



Suspended above a large scale bee, actors Thomas Brown and Robert Oliver enact one of many blue screen special effects sequences.

of illumination for Kodak 47 shot in VistaVision format, but it was not as large an area as the live action sets." In the live action footage, it wasn't feasible to have that much light.

Narita used a combination of primes and zoom lenses, but never a long zoom. "Primes are much better; I used 180-200mm hard lenses," he explains. He used no filters, only the slightest Suprafrost in the interior sequence inside the house and smoke in the attic where the scientist father works on the prototype shrinking machine that reduces his children to miniatures. "When the machine is working it literally creates steam and to get that effect I used smoke plus liquified nitrogen." He used that recipe in the styrofoam grass set all the time "not to make it smoky, but to get a background that was slightly softer and to create a three dimensional look. If you see too much of the grass set, you can see that it's fake. We wanted to maintain some realism." In a real forest the size that the lawn was intended to appear, there's a visible atmosphere that Narita tried to instill, to add to the illusion and for depth of field.

Lighting techniques mixed with innovation helped make the foam grass look like real blades. "In reality, grass looks translucent and foam does not," Narita points out. "I had to put a lot of fill light with the bluegreen gel so somehow it looked like light was coming through an opaque material. We had to spray the grass with water constantly to keep it shiny." The amounts of water sprayed on the grass, and the smoke in the background had to be carefully determined. Part of Narita's function was to make sure that visual continuity was maintained from shot to shot and he was pleased that "the results looked magical."

Because *Honey* takes place over a 20-hour time frame, Narita had to light to accommodate for morning, afternoon and night, planning in advance what each time of the day would look like. "The set was gigantic and the shooting schedule was such that we'd have to shoot all day for morning, then come back the next day and shoot for night, then come back to shoot day again." Forty 6000 watt lights hung from the ceiling for ambience. Narita used half a dozen hairlights and 10,000 watts to create sunlight and added gel for afternoon. "By adding and subtracting gels on the key lights I could create different times of day." A slight touch of blue and green gel intensified the color of the green grass. Narita added blue in the lab rather than in the lighting for timing. "Timing can change colors a lot," he explains. "If normal printing light is 50% of each color, you can ask them to take red and green out so the image is predominantly blue. You can't change certain things within the image, but you can change the overall look."

Honey's four young stars spend most of their scenes dwarfed beneath blades of grass, and Nirita realized that the color should reflect on them. "I picked up the occasional streaks of light," he explains. "For straight daytime, I used tungsten 10K, and as the day progressed toward evening, I made those lights warmer with gels." Rather than reflectors or scrims, Narita used a couple of little mirrors to "bounce off the 10K's for a sharper sunlight effect."

Narita made good use of his Matthews Cam-Remote which had proved its worth in many a music video. "You mount the camera on a crane so there's no operator; all the movements are joysticked around from the ground." The Cam-Remote was especially useful in the grass scenes when it was not possible to bring in any kind of crane. "With the remote, we were able to bring in a small manual crane, mount the camera on it and move it around, so we could shoot down on the kids from all directions." Shooting up would have revealed the end of the set. In order to make maximum use of the stage, so it would not look like all the action took place in spot on the lawn, portable grass stalks and blades were built, which enabled the camera to move through the "yard" without ruining the grass. "And the remote camera was the only one we could use in this situation, except for some dolly shots." But dolly work was limited by the density of the grass on the set, and the ground, which was not flat.

Of his experience in Mexico, Narita concludes: "The good energy and enthusiasm compensated for a lot of the problems. I enjoy the challenge of working in different parts of the world and the country. The problems encountered are just part of that challenge."

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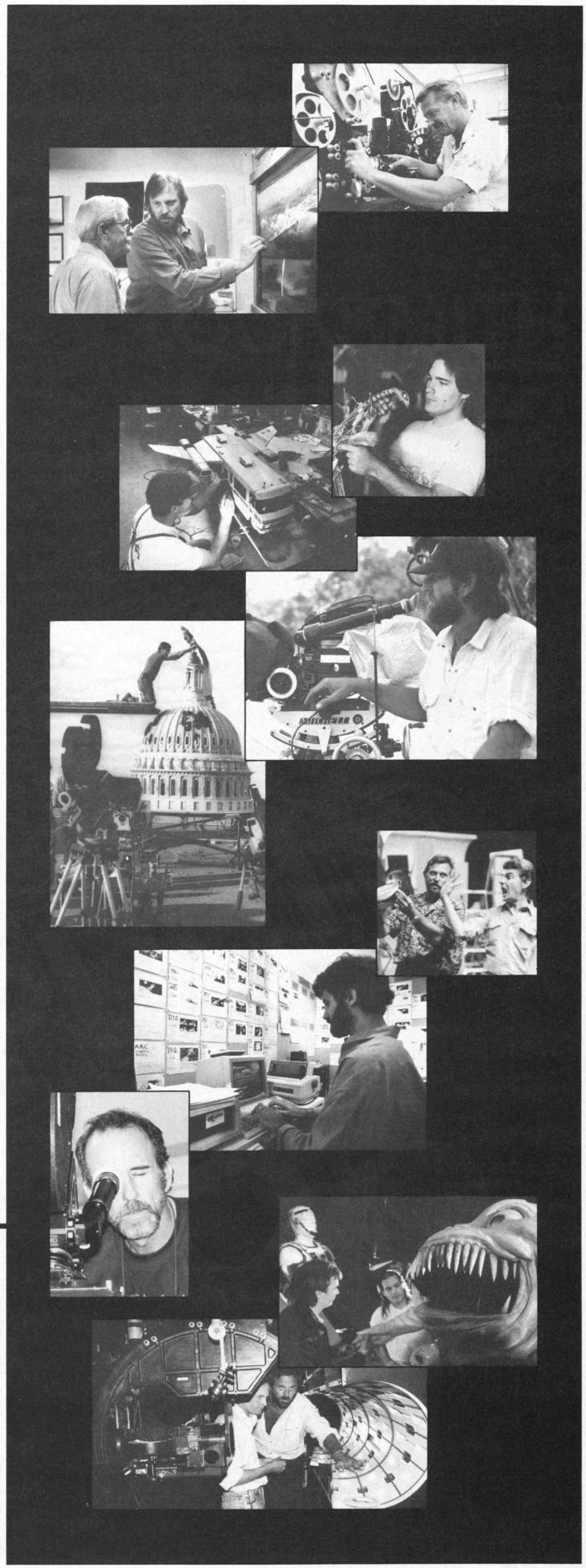

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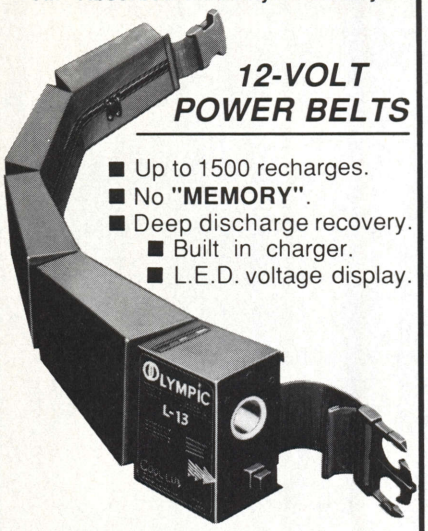

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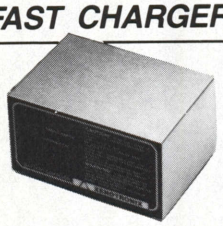

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Shrink List A Honey!

My list for *Honey, I Shrunk the Kids* was as intriguing as it can get, even in weirdy Hollywood. Creations on demand included: a shrinking cannon (with personality); a pony-sized ant; bucking bee abdomen and thorax; 4,000 gallons of edible mud; 20,000 gallons of warm milk; a dozen exploding apples; 200 4-foot raindrops; a one-ton broom for sweeping kids off their feet, etc. etc. . . .

Most people recognize generic physical effects as rain, wind, and fire – to name a few, but what made *Honey* so interesting was creating an unusual environment and achieving the correct scale effects while staying true to the camera.

What appeared to be simple rain drops was a collective R&D of evaluating volume, pressure, viscosity and containment in order that the result be a 400 lb. crashing-down drop of water. The same research had to be done on the other fluids in the film: milk and mud. And they had to be purified and warm enough for the children to swim in. The "milk" was in fact, consumable though not very nutritious!

Our company, ImageEngineering (Burbank, Calif.) rose to the occasion and we completed the above list. The cannon was not just a working prop. We incorporated a real laser dot so the planned optical enhancement would have a target for the overlay. Completed, it was described as a laser-guided, super-conductive cryogenic machine — and it did have personality!

The ant was a combination of nitrogen-powered air cylinders for the main body, cable joysticks for the head, radio controls for the mandibles and eyes, a cable system for the antennae, and live puppeteers to bring the creature into fearsome reality. One element of the bee sequence was to guide a bee abdomen and thorax so the children could ride the rear, 12 feet off the ground, in front of a blue screen. The movements were constructed with external plates moved by an independently articulated vertebrae. We designed individual custom harnesses for the children so that all the extensive support and flying required would be comfortable.

—Peter Chesney

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Photos by Ralph Nelson

Back to the Future Becomes a Series

by Marc Daniel Schiller

It has been almost five years since writer-director Robert Zemeckis concluded his comic adventure film *Back To The Future*, with the promise that there was more to come. Since then, audiences around the world have eagerly awaited the next escapade of Marty McFly, the American teenager who traveled back in time. With the current release of *Back To The Future Part II*, Zemeckis finally makes good on his promise.

Thinking into the future himself, Zemeckis teased the audience in his ending to the first film. At the conclusion of *Back To The Future*, the eccentric scientist Doc Brown (Christopher Lloyd) returns from the future and spirits Marty (Michael J. Fox) and his girlfriend out of the house and into the time travelling DeLorean which whisks them off into the year 2015. *Back To The Future Part II* continues the adventure exactly where the first film left off.

Reuniting the original cast and crew took five years, but the sequel promises to be well worth the wait. It was *Back To The Future* that began the highly successful collaboration of writer-director Zemeckis and director of photography Dean Cundey, ASC. In 1988, Zemeckis and Cundey teamed up for a second time on *Who Framed Roger Rabbit?*, for which Cundey received an Academy Award nomination.

Now united for a third time Zemeckis and Cundey traveled back in time themselves, returning to the back lot of Universal Studios where the sets and locations of the original film were reconstructed for the sequel. Marty McFly returns to the past once again, and actually goes back into the scenes of the original film. By using extensive special effects sequences and recreating those scenes, Zemeckis and company were able to bring Marty back to experience the past and the present once again—but this time from different perspectives. *BTTFII* goes one more step by allowing characters to revisit different times in their lives, and actually interact with themselves.

"I thought that *Who Framed Roger Rabbit?* was as complicated as it was ever going to get," Cundey says. "But when we started *BTTFII* I realized that this film would be even more complicated than *Roger*."

Cundey had to design and create lighting schemes for four different time periods. Each period had to have a unique look and

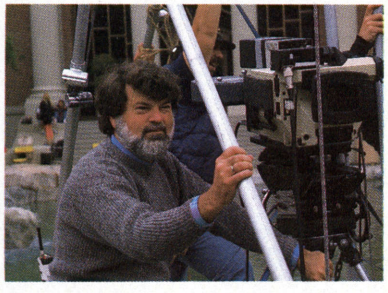
mood. "In the film we show what are basically the same sets and locations in the fictional town of Hill Valley, only at different times in Marty's life," Cundey explains. "This meant that each period had to give the audience a different feeling about that time. Sometimes are more pleasant than others."

Back To The Future Part II can be separated into four different time periods: (1) the Present—1985, (2) the Future—2015, (3) the Past—1955, and (4) an altered Present—1985.

"We shot each period trying to convey to the audience a different interpretation of the settings," Cundey stated. "Bob generally favors low angles and wide lenses. As with any Bob Zemeckis film, you have wonderful settings and backgrounds for the characters. The places are very important to the story. It means that I always have to light a large area. While it's sometimes hard to be 'painterly' with the light, it's always a great challenge to work this way. The use of the wide lenses seems to create an atmosphere in the theater in which the audience feels as though they are included and a part of the locations.

"We all discussed that the Present would be the least attractive or pleasurable of the different time periods." Cundey says. "Since it is the most familiar period, it's also the most realistic. I used lighting that would feel familiar to the audience. We used a lot of practicals, fluorescents and mercury vapor lights. For the more nostalgic periods of the Past and the Future, I wanted obviously a warmer look. I used only incandescent lights and was conscious of keeping any 'ugly' light, especially fluorescents and mercury vapor lights, out of the shot."

In reconstructing the scenes from the first film which took place in 1955, Cundey and production designer Rick Carter were faced with the difficult task of creating an exact duplication of what had been done many years before. (Lawrence G. Paull was the production designer on the original film.) "Since we start off at the exact point where the first film ends," Cundey maintained, "the idea is that you could put the films together and watch them straight through on a Sunday afternoon.



Opposite page and above: *The Hoverboard scenes required elaborate setups on the Universal lot.* Left: *Cundey and the unusual camera rig.*

We went into shooting the sequel with the feeling that when the audience was watching the new film they would be making comparisons and references to the first one. With video you could create one long movie by watching the two together. What it meant from a technical standpoint was that we had to recreate the lighting exactly as it was for the first film. I was lucky to have most of the same crew with me again. They remembered where we put certain lights and things."

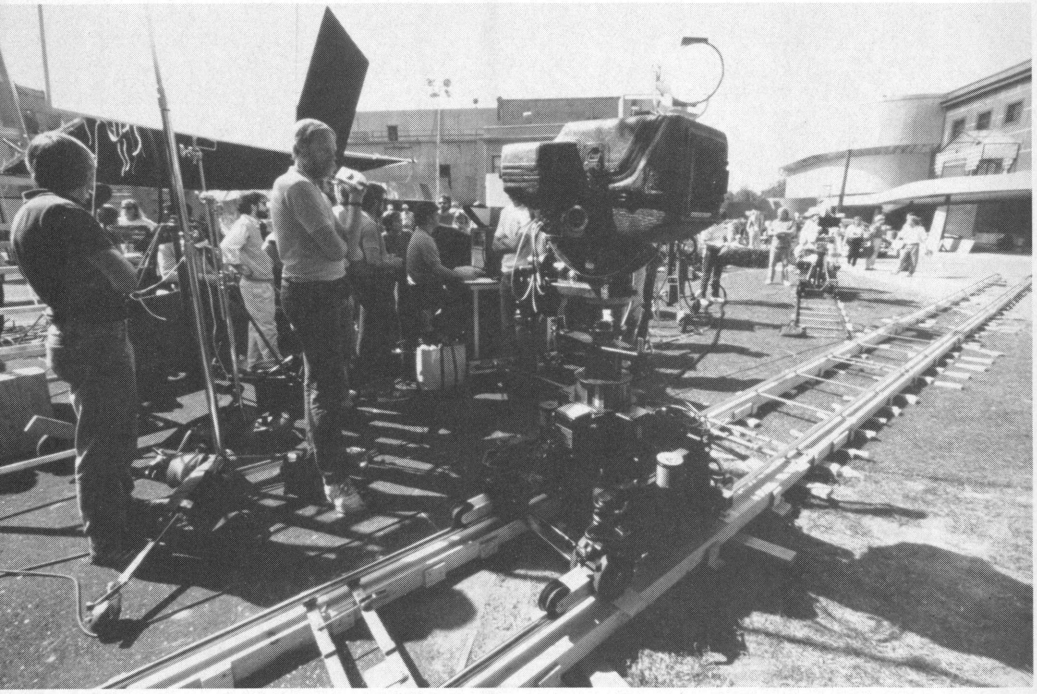
Key sequences, such as the "Enchantment Under The Sea Dance" in which Marty's parents kissed for the first time, were re-created, enabling Marty to re-enter the scene and interact with the Marty of the first film. To create sequences in which the same actor can portray multiple characters all interacting in one shot, Cundey developed with Industrial Light and Magic what is being called the Vistaglide by some and "The Tondreau Dolly" by others.

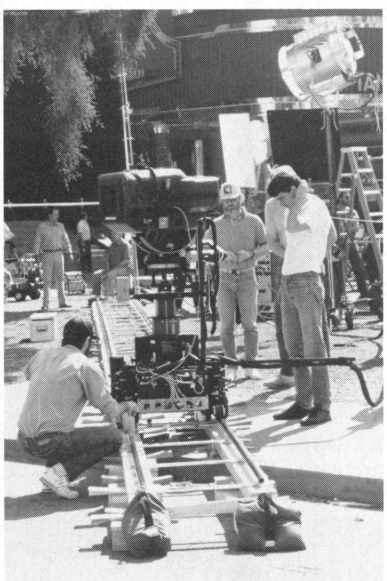
"On the set we refer to it as the Tondreau Dolly," Cundey stated. "It was the technical brilliance of Bill Tondreau, the engineer at ILM who created the software to operate the motion control in real time."

The Tondreau Dolly is a portable, computerized dolly system which remembers the complete movements of the camera. The computer then recreates the movements so that multiple images can be composited in such a way that the different characters played by the same actor seem to be performing in the same shot with each other.

"We started thinking about it after Bob and I finished shooting *Roger Rabbit*." Cundey explained. "Before the Tondreau Dolly was built, you could recreate by computer only the tilts and pans of the camera. But to shoot this film on real locations, we needed a portable unit which could also remember the movement of the camera."

The dolly allowed Cundey to move the camera freely to create shots in which the action follows one character into the shot, picks up a second character played by the same actor or actress, and





The Vistaglide rig, or "Tondreau dolly", was developed to capture moving split shots, enabling actors to play more than one role in the same shot without necessitating a locked off camera.

then follows this second character out of the shot. Prior to the invention of the Tondreau Dolly this shot would have been impossible.

"We simply moved beyond the old restrictions of having to lock down the camera," Cundey maintains. "Beyond this, we found other uses for the dolly which we had never thought about. For example, in the scenes which take place in 2015, the cars fly rather than drive on the roads. We realized that the Tondreau Dolly would be a perfect device for dealing with the cables that suspend the floating objects. We could remove the cables by compositing over the wires the same exact shot, except without the suspended objects."

Using the Tondreau Dolly meant adapting the production design to accommodate the large piece of equipment. "First of all, everything on the stage had to be wild," Carter commented. "We also had to reinforce everything so that there was absolutely no play in the platforms. On the Tondreau shots the camera makes numerous passes which had to be exactly the same. Any small movement could ruin the entire shot."

Cundey's approach to the scenes which take place thirty years into the future - in the year 2015 - was to create a look which he likes to term as user friendly. "We wanted the future to be an extension of 1989," Cundey says. "The visuals had to be recognizable, yet just different enough in their approach to color to make it feel a little more pleasant and have that warm nostalgic quality. We never wanted it to become so futuristic that it wouldn't be accessible."

Rick Carter also describes the film's approach. "We attempted to demystify the future by making it seem optimistic in a very humanistic way. It is a future which should be as clear and known as the past. It was important to design a future based on points of reference from today. It should appear eclectic, as if the town truly evolved into the future.

"As the film takes us from 1955 to 2015, we see the town square of Hill Valley evolve. What's fun in watching the films is that you see how the locations change over time," Cundey believes. "There is a part of the film in which Marty returns to 1985 to find out that Biff Tannen (Thomas Wilson) now runs the town. We called this period of the film 'Biff Horrific' because the pleasant town square has now been turned into your worst nightmare. For example, the quaint little courthouse has now been turned into a casino called 'Biff's Pleasure Palace'.

"My approach to the 'Biff Horrific' segment was much different from the others. I thought it was important to become more claustrophobic with the camera so that you feel Marty's reaction when he sees what's happened. I used mostly long lenses to compress the shots so that the town was more imposing and foreboding. We turned the back lot of Universal into this gritty, decadent-looking set. We used a lot of neon and blinking lights on the facades of the buildings. I wanted to see a lot of movement in the lights."

For the interiors, Cundey placed the lights behind pillars and around corners. "Rick Carter built this wonderful set for Biff's penthouse apartment which resembled a tacky Las Vegas hotel room," Cundey remarked. "I wanted to bring out the gold leaf and gaudiness of the place.

"We wanted most of the 'Biff Horrific' sequence to feel quite dark," Carter stated. "Most of the scenes take place at night. I wanted the colors to be mostly blacks, deep blues and maroon—like a big bruise.

"As a cinematographer, I guess what I enjoy most is to mix different colors in the frame." Cundey says. "It was a lot of fun shooting the 'Biff Horrific' sequence, because I could backlight with different colors of neon and create contrasts with the light. While we have become accustomed to seeing night with cool blue moonlight there's not much color in it. I prefer to include other colors and photograph people under a warmer and more attractive light."

It's Been A Great Year!

OSCAR NOMINEES - BEST CINEMATOGRAPHY

John Seale, ACS - *Rain Man*
Sven Nykvist, ASC - *The Unbearable Lightness of Being*
Conrad Hall, ASC - *Tequila Sunrise*
Dean Cundey, ASC - *Who Framed Roger Rabbit*
Peter Biziou, BSC - *Mississippi Burning* ★

EMMY NOMINEES - BEST CINEMATOGRAPHY FOR A SERIES

Stevan Larner, ASC - *Beauty and the Beast* "Ceremony of Innocence"
John C. Flinn III, ASC - *Jake and the Fatman* "Wish You Were Here"
Richard M. Rawlings, Jr. ASC - *Paradise* "Long Lost Lawson"
Roy H. Wagner, ASC - *Quantum Leap* "Pilot" ★

EMMY NOMINEES - BEST CINEMATOGRAPHY FOR A MINISERIES OR SPECIAL

Dietrich Lohmann - *War and Remembrance* "Part II"
Bradford May - *Favorite Son* "Part 3"
Gayne Rescher, ASC - *Shooter* ★
Roy H. Wagner, ASC - *Disaster at Silo 7*

ASC NOMINEES - OUTSTANDING CINEMATOGRAPHY: TV SPECIAL OR PILOT

Philip Lathrop, ASC - *Little Girl Lost* ★
Isidore Mankofsky, ASC - *Davy Crockett*
Eric Van Haren Noman - *Lena: My Hundred Children*
Gayne Rescher, ASC - *Shooter*

ASC NOMINEES - OUTSTANDING CINEMATOGRAPHY: MINISERIES

Dietrich Lohmann - *War and Remembrance* ★
Cristiano Pogany - *Noble House*
William Wages - *Gore Vidal's Lincoln*

ASC NOMINEES - OUTSTANDING CINEMATOGRAPHY: FEATURE

Peter Biziou, BSC - *Mississippi Burning*
Conrad Hall, ASC - *Tequila Sunrise* ★
Sven Nykvist, ASC - *The Unbearable Lightness of Being*
John Seale, ACS - *Rain Man*

ASC NOMINEES - OUTSTANDING CINEMATOGRAPHY: TV SERIES EPISODE

Stevan Larner, ASC - *Beauty and the Beast* "God Bless The Child"
Alex Nepomniaschy - *Sable* "Toy Gun"
Richard M. Rawlings, Jr. ASC - *Paradise* "Stray Bullet" ★
Roy H. Wagner, ASC - *Beauty and the Beast* "No Way Down"

BRITISH ACADEMY AWARD - OUTSTANDING CINEMATOGRAPHY IN A MOTION PICTURE

Allen Daviau, ASC - *Empire of the Sun* ★

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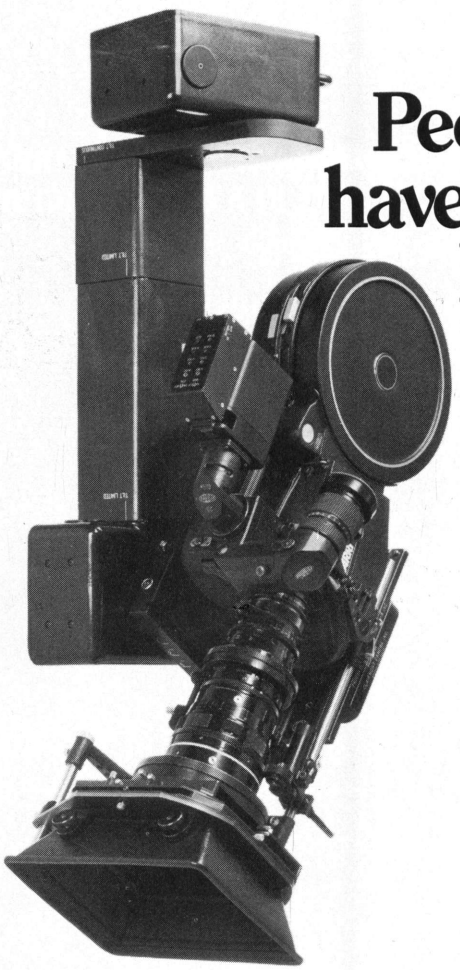

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One of Cundey's main concerns in shooting the *Back To The Future* films was the special effects make-up, which aged the actors as much as 50 years. "You have to be sensitive to the needs of the make-up guy, who is creating old age using rubber and paint." Cundey commented. "It's difficult to create a realistic skin texture using appliances. I have to watch very carefully for cracks or creases in the make-up. I must make sure that my lighting doesn't call attention to the make-up. What's interesting is that it varies from day to day. On one day a cross light will bring out the texture of the appliance and on another day it won't. You have to be careful and accommodate the appliances."

In *Back To The Future Part II*, the creative team of Robert Zemeckis, Dean Cundey, and Rick Carter again attempts to transport the audience into the fictional town of Hill Valley, where they can join the wild ride through time with Marty McFly. "What we are trying to do is put elements in front of the camera which will hopefully make the time traveling plot visceral and fun." Carter explained. "What I think is really great is that the audience takes what Dean and I do for granted. The visuals are never imposed on the audience. As opposed to most fantasy and science fiction films, I don't think anyone is ever supposed to be in awe of what they are watching. The idea is to create a more intimate feeling between the audience and the characters. As with most of Bob Zemeckis' films, I guess what we are trying to create on the screen is this wonderful feeling of nostalgia." ▲

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Astonishing Effects Slate for *Future*

by Ron Magid

A production conglomerate of many talents has combined to conduct a major experiment in human endurance, to see how long creative people can make films before running out of steam. Thus we have back to back *Back to the Future* sequels, ostensibly to spare the moviegoing public from tearing its hair out waiting for the sequel to the sequel of one of the most popular films of all time. The studio's real motive is to curb the increasingly absurd rise of sequel budgets.

Meanwhile, back at ILM, it's the effects maestros who are losing hair and sleep frantically trying to post-produce *Back to the Future Part II* while *Back to the Future 3* is still in production. The man bearing the brunt of the ever-increasing burden is Ken Ralston, who worked as effects supervisor on Robert Zemeckis' original *Back To the Future,* before jumping almost immediately into that same director's *Who Framed Roger Rabbit?* The more than state-of-the-art effects nearly drove Ralston and his crew to distraction. "I was shot after *Roger Rabbit* and I'm still not ready to make another film," admits Ralston, whose animated demeanor and sardonic sense of humor make him seem like a character who stepped out of a *Roger Rabbit* cartoon.

Sometimes sequels are easier to do than the original, because the effects artists are allowed a second chance to go back and improve effects from first film - but not this time. *Back to the Future Part II* is almost entirely different from the original. "Bob has taken the joke of time travel and twisted it as much as anyone could," Ralston says. "He's made a very intriguing story using all the implications and the repercussions of changing time. There's ten films within this film, but as big as this sounds, it's not one of those movies that's so big you hate it. The characters are not second banana. Bob still has this nice tight personal film going, despite the strange, insane reality that surrounds each sequence."

Back to the Future Part II picks up right where the first film left off: Doc flies Marty and Jennifer into the future in a souped-up, Mr. Fusion-powered DeLorean, but when they arrive, Jennifer and Marty quickly realize that the state of the family they will build in the future is disastrous. "Marty has failed miserably in his future, he's a nothing," Ralston says. "Of course he thought he was going to turn into a hot rich rock star, but really he's become an awful little insurance salesman in a suit with an unpleasant family."

To repair the situation, Marty must deal with himself as a middle aged man, as well as with his children, Marty Jr. and Marlene. Since all of these characters were played by Michael J. Fox, Ralston's prime headache was figuring out how to insert Fox in scenes opposite Fox, in which both "characters" have to interact. This necessitated taking the split photography seen in films like *Dead Ringers* to undreamt of lengths. The creation of a remarkable new live-action motion control system was required, called the Vistaglide. "We shot all of our split scenes with the Vistaglide system, which used the cameras we built for *Roger Rabbit*," Ralston explains. "Essentially, it's the best live action motion control system there is. It's silent so you can shoot sync sound, and it also uses any standard dolly track.

"I was absolutely petrified when this thing started," Ralston says with characteristic candor. "It was exactly like what happened on *Roger Rabbit*—we took these prototype cameras to England to shoot a whole film and I didn't even know if they worked! And I felt the same way about this whole Vistaglide system. I was worried to death through the whole shoot about making sure we shot it right. Bob was calm - he'd take all day to get one shot. He finally said to me, 'You know, Ken, you're so worried, you're making me worried! You're just doing a split, right? Just calm down.' 'But Bob, you don't understand!'" Ralston recalls telling Zemeckis, a nervous quaver in his voice, "'This stuff's never been done before - again!'"

But before scenes could be split or Ralston could tear out a single hair, someone had to design the future of *Back to the Future Part II*. When the film was to originally have been made in 1986, John Bell, a young, up and coming effects art director was lent to the production by an already leery Ralston. "The future is John Bell," Ralston laughs. "He designed much of the live action part of the film. I thought he'd work in L.A. for a short time, but he was so good - and I knew this would happen at the time - it turned out to be five months! I'd call up and ask if I could have John back and they'd make excuses. It went on and on and on. The future John came up with is this tongue in cheek, Bob Zemeckis future. Everything you see was built from scratch — everything: all the futuristic cars, every piece of clothing. About the only things they didn't have to build from scratch were in the antique store that sells CD players, dustbusters and things like that from the 70's and 80's!

"They completely changed the whole courthouse at Universal three times! In the future, the courthouse area is a disaster. Biff - the villain of the first film - has become the most powerful man in California and now the courthouse area is full of Hell's Angels, porno joints, prostitutes and bums everywhere. Hell is breaking loose!"

John Bell was responsible for much of the look of it all. Aside from designing Tuck's pod for *Innerspace*, Bell also handled some of the initial conceptual work on *Willow* and *Star Trek IV*, as well as some design and storyboarding on *Tucker*.

"This has been the big show for me, the biggest project by far," he admits. "I started working on *Back to the Future Part II* in '86,

Three of the elements that came together for the shot on this issue's cover: The DeLorean, shot against blue screen on a wire rig by cameraman Peter Daulton (opposite page); a matte painting of Hill Valley by Yusei Useugi (above); and an upside down shot of the Delorean that will eventually be flopped so the car appears to zoom directly over camera. Daulton operates the Vista Cruiser motion control camera (left).

Right: ***Ken Ralston (right) and Mike MacKenzie (in red) performing preliminary registration tests on the VistaGlide. At this point the system was still in the developmental stage.***
Below: ***Working from photographs at left, Richard Miller sculpts a futuristic police motocycle.***

when we thought they were going to make it then. I was told the film would take place thirty years in the future, and they asked me to come up with anything and everything for that time period. I thought they might want some of the action in the second film to play in the same key areas from the first, so I decided to first get an idea of what the town square would look like in the future: the courthouse, the cafe and so on. I did 3/4 shot sketches, so to speak, of the square, then went back in and detailed the interiors. In each drawing, I pointed out some particular thing like a hoverboard, an automobile or a costume in closeup. I came up with a whole stack of designs and presented them to Bob Z. [Bell's nickname for Zemeckis], who liked them really well. But he went right into *Roger Rabbit* instead.

"I stopped working on *Back to the Future Part II* and went on to other projects. When it started up again in September of '88, Rick Carter, the production designer, really wanted me to come down. At that time, I read the script they'd written, and I noticed things I'd put in my sketches in 1986 verbally outlined in the script itself, so I think my early drawings had a bit of an influence on the film from the beginning."

This time around, Bell was relieved to see the art department boasted some 25 designers. Even so, things were hectic from the beginning. "Rick would keep feeding me things to do, and I didn't have time to rehash ideas," Bell recalls, "so I'd do a design and hope it worked on the first shot. Fortunately, we all seemed to be on the same beat. They didn't want a *Bladerunner* future, that was definitely out. We wanted things to have a sense of humor to them, so I painted an optimistic, colorful future.

"Since we were only going 30 years in the future," Bell adds, "things couldn't be too different, so I'd try to base my designs on recognizable things around today. Bob Z. would say, 'We should know how 85% of the stuff works, but the other 15% we only think we have an idea of how it should work.' The designs had to have a thread of something recognizable the audience could grasp onto, which made them more acceptable and gave them a little more character. My designs involved a certain amount of logic to figure out how something would change over the next 30 years. About halfway through the design process, I'd throw that approach out and do what looked good on camera, so I'd get a mixture of believability with some whimsy as well. That seemed a good formula for me to go on.

"Retro-fitting is a big thing in the future," Bell observes. "There's all this garbage left over from the past, so we've got to do something with it. We thought that in the future, Midas would provide a service that would allow you to retro-fit your classic Mustang to be a hovercraft, mag-lev car, so we gave a lot of contemporary cars a common retrofitting package - an underbelly wheel treatment and some aerodynamic pieces on the front and back for stability - with a Midas logo on them."

Bell, who studied transportation and industrial design at Art Center College of Design in Pasadena, then worked for General Motors prior to joining ILM, was thrilled when *Back to the Future Part II* turned out to be one of the few films he's done that allowed him to use his training. He is particularly proud of his taxicab design. "There isn't a thing I'd change on that," he beams. "I started off with a few different concepts and showed them to Bob Z. The one he went with was reminiscent of a Citroen, so he thought we should take the design and see if we could keep the same feeling

and flavor by using a real Citroen as a base. I was working with Mike Schiffe, whose company, Wonderworks, made the models. Mike was in charge of overseeing everything being built the way it was designed. He found a Citroen source, so we took drawings of the Citroen and applied our designs over the actual car with some modifications. We redid the front end extensively, added some pieces to the top and the back, and a paint job that attracted everyone's attention. It turned out great."

Bell's design for the interior of the Cafe 80's is perhaps the most whimsical in the film, an homage to the most ridiculous aspects of 1980's pop culture. "The whole place was fitted with things that were very depictive of the 1980's," he says. "We used the year-end Life magazines for reference. There are no waiters or waitresses at the Cafe 80's; it's all robotic TV monitors that come over to your table. Ronnie and Nancy greet guests via TV screens at the front of the cafe, while celebrities like Michael Jackson appear on the screen to serve you. They're done in a stylized, Max Headroom look, with a lot of stuttering and broken up imagery. There's a 'No Nukes' booth and a 'Just Say No To Drugs' booth, and lots of blasting color. The 80's is big on color and graphics, so we bathed the interior and exterior with bright red, turquoise, and yellow. I think it'll be fun to look at on-screen."

Once the designs were all locked down, the headaches really began to build up for Ralston. He had realized even before *Back to the Future Part II* started production that it was too much work for one man too handle, so he brought on Scott Farrar as his assistant. While Ralston was busy supervising the complex split scene photography, Farrar attended to the equally important tasks of shooting practical wirework effects like flying cars and hovering skateboards.

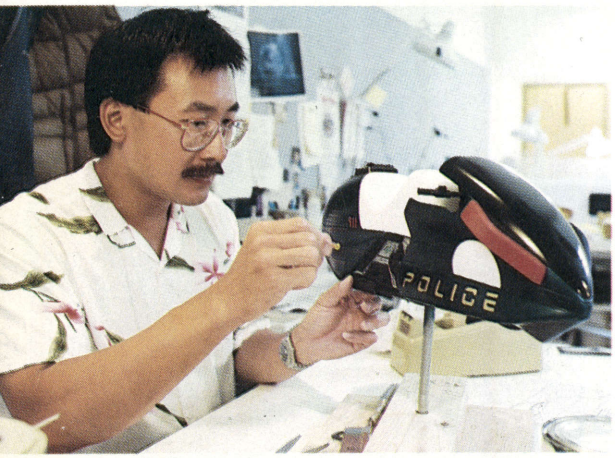
"I'm the main effects supervisor, the guy who's really involved with the whole design of the show," Ralston clarifies. "I was on set with the first unit and Scott was on set with the second unit for the entire shoot. He's already done one show on his own, *Cocoon II*." Farrar has worked on most of the pictures Ralston has done at ILM, usually serving as camera operator or effects director of photography. On this film, Farrar backed Ralston up more than usual as associate effects supervisor.

Miller puts finishing touches on the cab driver of the future. John Foreman, visible at center, worked on the pseudo-Citroen's wiring.

"I worked with the second unit director, Max Claven, who's been in the business a long time.," Farrar notes. "He's very good. He knows you only need short pieces of film and you've got to keep the action moving. A lot of the second unit work involved hanging people from wires for the hoverboard sequence, and flying cars. A lot of the stuff worked just as we shot it because most of the time, we were able to come up with some great physical solution on set. We kept pursuing that, because we wanted to make sure it looked like Marty was flying on that hoverboard so the audience would believe it. Just to be on the safe side, we shot Vistavision 'wire protection' shots so we could play with them back at ILM if something went wrong. We were very happy when our practical shots could get away without being worked on by ILM."

Perfecting the wirework in these shots was often a matter of trial and error. "Just like anything else," Farrar says, "we scratched our heads and tried something and took a look at it in dailies. The angle of the sun had a lot to do with which shots we would do when, and what angle we could shoot. Certain shots were morning shots, or afternoon shots because we didn't want the angle of the sun to hit the wires and create a glint on film. Many of our shots were refined and redone again and again, and each time we were a little bit better at it. Sometimes we'd have fine little piano wires spread throughout the shot, which were made invisible by the busy texture of the backdrop and because we used vibrators to jiggle them so they wouldn't show up on film. It's an older technique that comes from stop motion animation: when something is in the shot that you don't want to be seen, you wiggle it a bit and the camera won't see it."

For the hoverboard chase sequence, in which Marty is pursued by Biff's son Griff through the streets of his futuristic hometown, Farrar and his crew suspended stuntmen in harness rigs from a Chapman crane. "We'd vibrate the wires and have them jump onto the hoverboard, which seemed to lift them off the ground. Actually," he reveals, "the stuntmen had magnets on the bottom of their shoes and the hoverboards had magnets hidden inside, so they'd attract each other. The shot would work for a number of feet until the board fell off. We worked nights



Modelmaker Larry Tan with a finished version of the police motorcycle.

for a couple of months and days for another month on the backlot doing the hoverboard chase. It was a tremendous amount of work for every shot.

"There are some extraordinary miniature blue screen shots in this film," Farrar points out enthusiastically. "Pat Sweeney and Peter Daulton, two of our motion control track camera operators, have done some wonderful work with match moves where a real car takes off on wires, passes behind someone and then is replaced by a miniature car. It was really tricky stuff because they had to match the miniature's size exactly to the size of the full scale car. It's seamless."

"There's a lot of motion control flying car stuff," Ralston agrees, "which is pretty standard, except when we're dealing with an aerial freeway with cars all over the place and lane markers floating in mid-air all locked into a major shot of the courthouse area. All of this is preceded by a long flight through clouds and aerial lane markers whizzing by the DeLorean. They're on the wrong side of traffic and cars are racing at them and taxis almost hit them, so they peel out of the way. This shot is very tricky because we've got a lot of registration points to judge it from. Unfortunately, there's nothing up in the sky in the background plate, we had to put it all in. Everything is complicated by the way Bob wants to shoot those shots: moving the camera and throwing focus in and out. Pulling focus is a function on the Vistaglide system, but we have to fake it in optical when we add a model car to the shot."

Ralston found himself wishing he could have used the Vistaglide system to record these complex aerial background plates, but it wasn't possible with current technology. "Much of the flying car stuff had to be shot against standard, non-motion controlled background plates," he grumbles, "and the models have to be plotted in almost by hand. Some of these shots have been very complicated to do, because the camera's on a crane and it's bouncing along. I would just as soon have shot it locked off."

The reveal shot of the courthouse caused massive electrical problems for Ralston. "It's a big, Las Vegas-y looking building, with tracer bulbs moving in sequence that had to match to the full scale, live action set as they spelled out 'B..I..F..F..'S.' The model was about nine feet tall to get the feeling of the scale we wanted for it. As usual, it's really complicated because Bob wanted the camera to tilt up to reveal the hotel."

By far the most impressive use of the Vistaglide system was in the mindboggling split screen sequences which usually involved compositing two characters played by the same actor into a single scene. On a couple of occasions, there were as many as four splits running through the same scene at once. "None of this would be possible without the Vistaglide," Farrar says proudly of the motion controlled Panther dolly system specially developed for *Back to the Future Part II*. "That's the only way we could achieve these shots. It's able to record sync sound and repeat any camera move over and over again along all different axes of movement. Although the Panther has an extending boom arm, we decided for accuracy to set the camera on the pedestal of the dolly, so it could boom up and down, pan, tilt and change focus as the dolly was moving down the track. One of the most important aspects is spending the time laying the dolly track, to ensure that it's firmly attached to whatever surface there is so there's no give. When we were shooting on something soft, we had to build it up so it was rigid."

Far more important than the technical wizardry employed in these shots is the cleverness of their design. "That's what makes these split shots so successful," Farrar notes. "It's not just the effect itself. I think there's a wonderful flow in many of the split shots which is what makes them special. We couldn't just do shots with one person on the right and another on the left, we had to intermingle the action so the audience can't quite figure it out. It's just like a magic trick - and just when you think you've got it, a couple of switches occur within the shot to keep you guessing."

"It really is sleight of hand," Ralston concurs. "It's difficult to imagine doing any more complex shots with real people on a set within those limitations, especially since Bob thinks so fast and changes things so often. I really had to be on my toes or I was going to get nailed. Bob's always coming up with stuff on the set: 'Hey wouldn't it be funny if. . .' That means he's changed something and I'm scrambling again and trying to foresee everything that could go wrong for us six months from now.

"Bob has shot the split scenes pretty much as he would live action scenes with limitations within the trick," Ralston adds, "but after a while, the camera's always moving around and the focus shifts all the time. It doesn't get any more complicated than this. A couple shots in this show are real Bob Zemeckis-y push-everyone-as-far-as-you-can-possibly-push-the-technique-and-then-some-and-see-if-it-works! I wanted to give Bob as much flexibility as possible, but I was also there to stop him from doing something I knew was absolutely impossible. We'll do the semi-impossible things, which is what he always wants, but some things are too much. I wanted to make sure everything was choreographed right so it'll work. Unfortunately, no matter how much you pre-design a show like this, it's ignored by the time you get on the set. Until the rehearsals start, you don't know what the problems are."

The biggest unforeseen problem for Ralston and company was the vast amount of makeup so essential to some of the most elaborate split sequences, where Tom Wilson as old Biff meets Tom Wilson as young Biff, or when a middle aged Marty McFly has

Jan De Bont

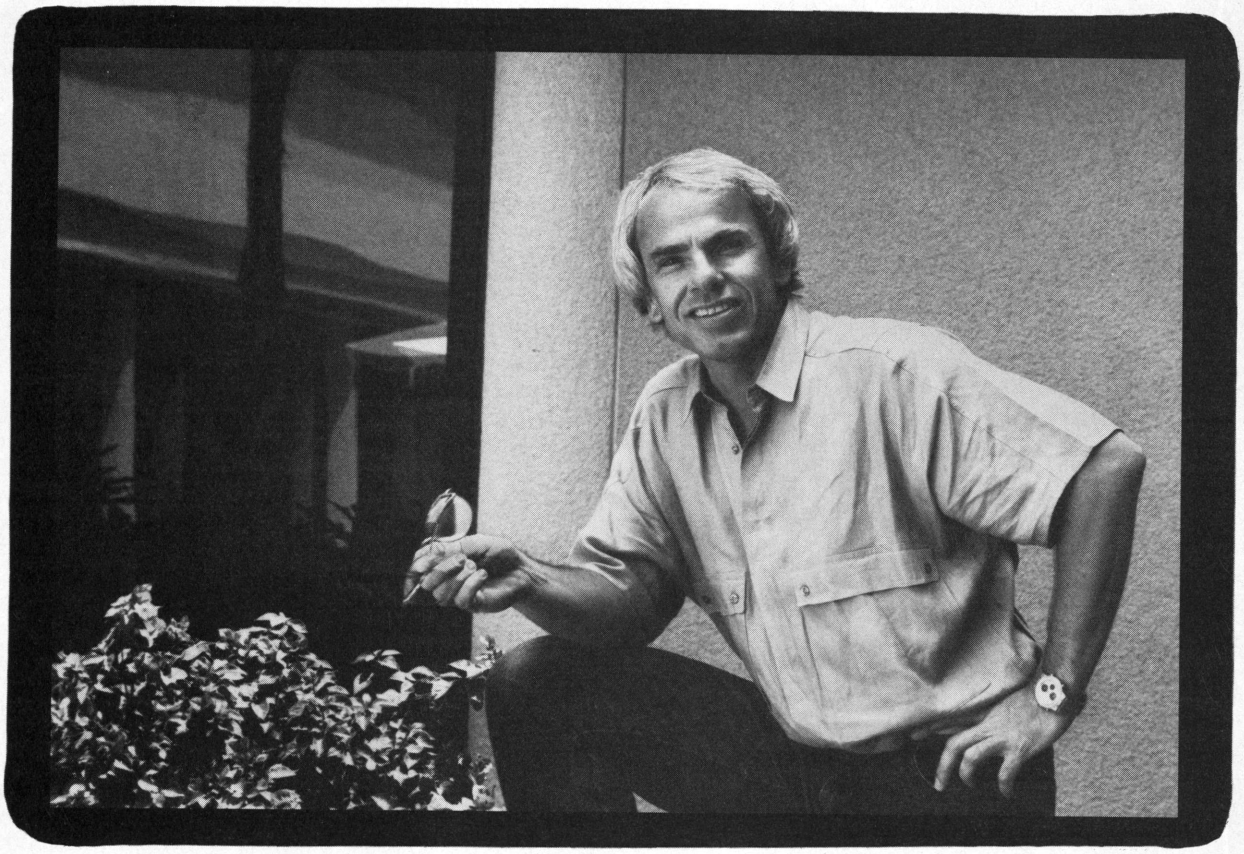


Photo: Gene Stein © Eastman Kodak Company, 1989

on film: "There is no one right way to shoot any movie. Cinematography is a very personal thing. The results should be different every time. When I start a movie, I have a million unformed ideas. Once I get a sense of the chemistry between the cast and director, and how they relate to the script and the environment, I trust my instincts and my eye. That's what makes it an art...with today's Eastman EXR films, there are very few technical boundaries. I can use very little light and still record beautiful images with crystal clear details, broad ranges of contrast, and velvet blacks. The film gives me the freedom to be more creative. But I never settle for just beautiful images. Every movie needs a visual psychology. That's its heart and soul."

Jan De Bont's credits include "Jewel of the Nile," "Die Hard," "Black Rain," and "The Hunt for Red October."

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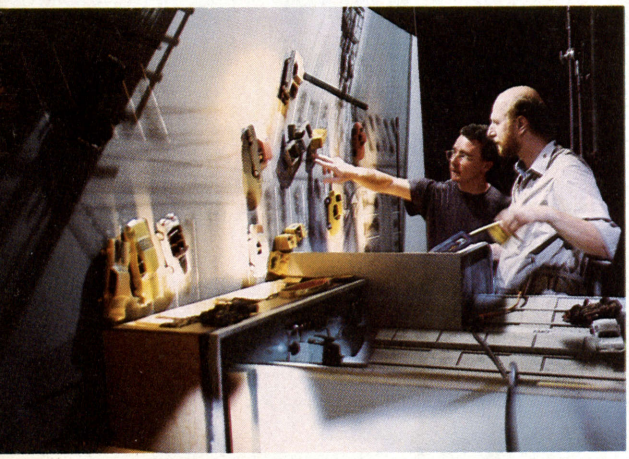

Art director John Bell (left) and chief modelmaker Steve Gawley work on one of the "Biff Hotel" sets. In the scene, the set will be rotated counterclockwise 90 degrees, so the camera will appear to dolly down the side of the wall.

dinner with his two kids, and all of them are played by Michael J. Fox! "Tom Wilson and Michael J. Fox both have very complicated roles," Ralston marvels. "Tom not only plays the young Biff from the first film, he also plays his 70-year-old self in the future, and Biff's psycho son, Griff. Michael plays himself as a 50-year-old man, as well as his son Marty Jr. and his daughter Marlene, not to mention Marty the time traveler! This is where all our complicated split scenes come into play. What's odd about this is that in nearly all our splits the characters are in totally different makeup, so it makes it harder to understand that the split scenes are really going on. You stop thinking of old Biff and young Biff as being played by a single actor, you think of them as two different characters because they look so different. I don't think a lot of people are going to realize it's the same person in these shots—and a lot of the credit should go to Kenny Myers and Michael Mills. Their makeup is a massive undertaking. Every scene involves makeup.

"Our crew, Sonny Burman, Nancy Hvasta and Marvin Westmore were a big help to us," Mills says appreciatively, "especially on the days we had to do four prosthetic makeups at once!"

The problems Myers and Mills faced in doing the elaborate old age makeups on Tom Wilson, who plays Biff, were exceeded only by the trouble they went through to strip the makeup and prepare him to shoot his scenes as young Biff - often on the same day! "That was much harder than shooting with him in normal makeup, then aging him later in the day," Myers explains. "Invariably we started each day by putting Tom in his old Biff makeup because it took so long to do: five hours total. We would start his makeup at 3 a.m.; by eight in the morning he'd be ready for camera, so then they'd shoot him for however long was necessary - sometimes they'd only use him for one shot. We were then pushed through by production to rip the old age makeup off his face and get him back to normal. His face was literally hamburger after a few weeks of this. We spent more time trying to patch up the red sores on Tom's face for the young Biff shots than we did anything else. What really killed us is that after we'd put in a solid day, then he'd have to go to work!"

Fortunately, Michael J. Fox's makeups didn't take nearly as long, but he played more characters. "Michael was completely covered with prosthetics to turn him into the 47-year-old Marty of the future," Myers says. "The only exposed areas were his nose and chin. That was handled by Fox's personal makeup artist, Bron Roylance, and me. Michael was in that makeup for almost a week. At the end of the day, they'd sometimes ask us to pop him into the Marty Jr. or Marlene makeup, which were done by Bron. The Marlene makeup consisted of a wig, some paint and cosmetic lifts to give a little more feminine line to his face. He's actually very good looking! Marty Jr. is very straightforward: just some sloppy hair. I created dentures for both of those characters: Marlene's are perfect, Pepsodent teeth, while Marty Jr.'s are a little on the green side and overlap a bit!"

Fox was still working on *Family Ties* during the day, so his work on *Back to the Future Part II* was limited to nights, which made things difficult for Myers and Mills, and downright impossible for Ralston. Michael was never available until late at night, so we shot all night," he recalls. "I had to force myself to stay awake and figure out what we were doing because I couldn't afford to miss anything. The shots themselves were very time consuming; the makeups took forever, and Bob put so many other mechanical effects in these shots that every aspect ended up taking a long time. 'Don't talk to me anybody - I'm trying to concentrate!' I'd say. 'It's four in the morning and I haven't slept in two days!'"

Since every aspect of the Vistaglide split photography had to be incredibly precise, Ralston and Zemeckis used video assist to view each pass with quick mattes put in so they could judge how well each side interacted. "The performances within these split shots had to be so precise to make the shot work," Ralston says, "and it took a lot of effort to concentrate on the set, because there were always distractions and problems I could never foresee. Some shots were simpler than others, thank God, but it got very complicated at times. Once we programmed the camera move on the Vistaglide system, the actors would have to lock their performances down precisely, and we'd just shoot it till it worked. They pre-recorded some dialogue and piped it in through little earphones to the actors so they could play to themselves. They couldn't watch a monitor during the shots because they'd be too distracted and the eyelines would be off.

"If we had any flexibility, it was in our first master take," Ralstone explains, "but that depended on the take. We usually liked to shoot the A side first—the side with the character who was really driving the scene - but that wasn't always possible. If we had old Biff on one side and young Biff on the other, we preferred that the young side became the master program, so we could match the old side to that. Unfortunately, we often had to do the shots backwards because of makeup problems—we'd do the wrong side first because it took five hours to put Biff into old age makeup, then we'd get him out of makeup and shoot the young side. Occasionally, we'd record the master program with him in old age makeup playing the young part with someone standing in for old Biff. It was a very complicated system, but if these shots work, it'll all be worth it because you won't even realize you've seen them."

One of the trickier scenes Ralston supervised involved old Biff trying to pass a sports almanac—with scores from every game

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played between 1950 and 2000—to himself as a young man. The two characters appear to be sitting next to each other in the front seat of a 1950's roadster. That was the easy part. The trick lay in devising a way for old Biff to pass the book to young Biff across the split screen without attracting attention from the audience.

"In order for old Biff to appear to pass young Biff the almanac across the split," he explains, "we rigged his arm to a servo motor hidden behind the dashboard, which meant the movement of passing the book to himself was completely repeatable. The mechanism consisted of a metal arm that actually held the book, which was connected to a servo-motor and hidden behind the real arm passing the book. That same mechanism was also hooked up to the Vistaglide camera, so each time we backed up the whole system, the arm mechanism backed up as well. On the side where Tom played old Biff, we used his own arm in the mechanism, while on the other, we used a stand-in's arm to give the book to young Biff. We made sure the stand-in's arm was the same size as Tom's, so we could match the arms exactly. It worked pretty seamlessly since both arms were traveling through the identical plane."

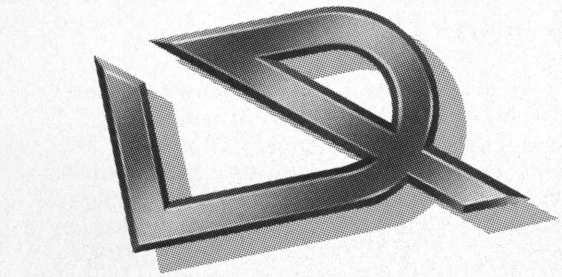
What really sells the book passing shot is the brilliant combination of on-set planning and bravura optical work by ILM's Stuart Robertson and John Ellis. "Each shot had to be completely custom," Ellis marvels. "Every shot was set up for a particular technique to work better than the others. We composited the straight split of young Biff talking to old Biff in the car by using a hard split right along the dividing edge of the windshield, but we used a soft split when the book's passed back and forth to help blend Wilson's arm and the stand-in's arm. Then that's combined with rear screen when young Biff tosses the book into the back seat and it crosses through the split behind old Biff - which really sold the gag.

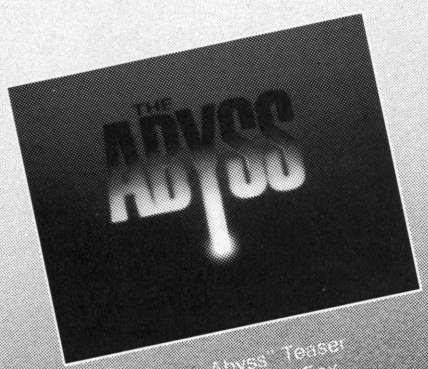
"What makes it interesting," Ellis continues, "is we have had to really figure out what is the best technique to use on each shot, which forces us to consider different options. We've got every technique you can think of working within this complicated, wacky story."

Another ingenious split scene occurs when Marty, the time traveler, runs into his own son in the Cafe 80's. In this remarkable sequence, Marty actually grabs Marty Jr.'s hat off his head and places it on his own. In designing scenes like this one, Ralston employs the special effects equivalent of sleight of hand with amazing ease. "See if you can figure that one out!" Ralston challenges. "Actually, the hat passing scene was a very clever series of cheats, but when you see it on screen, it comes across like you saw something absolutely believable. What's really going on in that shot is Junior falls down behind the counter where Marty is hiding. At that point, a stand-in dressed as Marty and seen only from the back, grabs Junior, lifts him up towards camera, throws him against the base of the counter, and moves his head and torso out of frame so only his hands, still holding Junior, are in frame. Which leads to the next part of the cheat: since Michael's hands are actually out of frame on the left side of the split, it's the stand-in's hand that grabs the hat off Junior's head on the right side, then drops it out of the shot.

"The cheat here is that the stand-in drops the hat off camera for only one frame, and then Michael brings the hat up into frame on the left side of the split and places it on his head. You think you've seen Marty grab Junior and flip the hat off Junior's head onto his own, because it's so fast. Then Marty lets go of Junior and leaps over the counter. That shot took eight hours to shoot. You can see everything perfectly clear, it's just those little frames that people will edit out in their own minds when it works.

"It's a nice shot," Stuart Robertson agrees. "We started out using a combination of hard and soft splits. A soft split occurs when you have to lose the edge in the middle of the field, whereas a hard split is employed on either side of a hard object. In most instances, we're going by the rule of thumb of trying to split the difference between where the people on either side of the split come closest to each other, so it's usually a bit of





"The Abyss" Teaser
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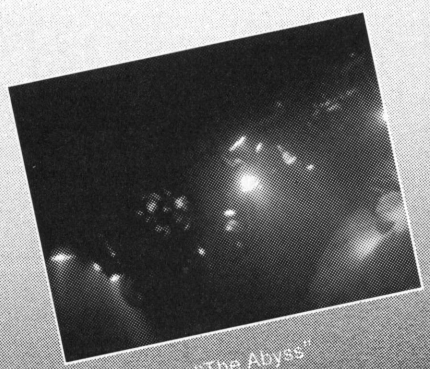
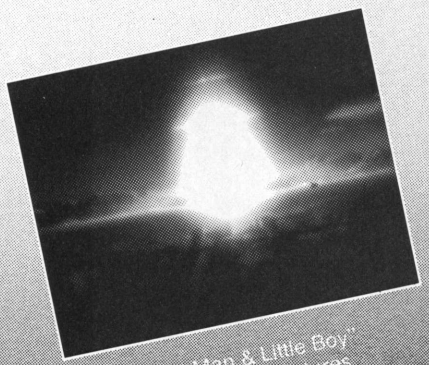


"The Abyss"
Sub Battle



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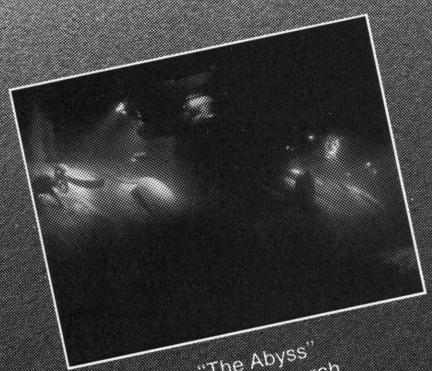

"The Abyss"
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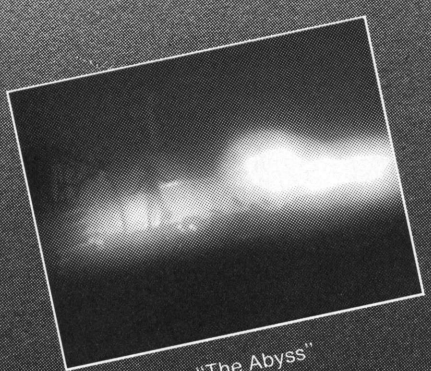

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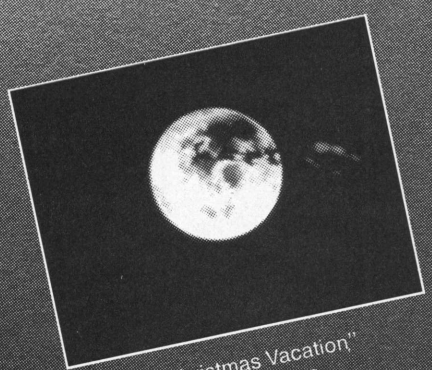

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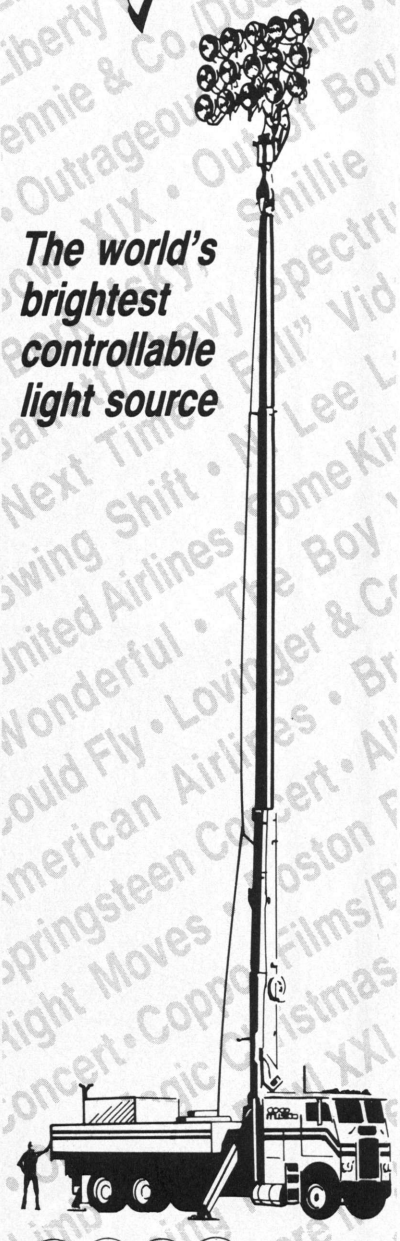
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an unusual shape, which makes it harder to see. It also gives us a chance to be sneakier - sometimes we have an object in the frame that looks like an obvious hard split line, but we'll put a soft split someplace else instead.

"In this sequence, we found a recipe that allowed us to take pieces of animation and turn them into moving soft splits. To blend Michael's arm and that of his stand-in, our plan was to put in a soft split and see what happened. Once we put it together with the soft split, the choreography helped the shot to work the first time around because there's a lot of crossover from one side of the split to the other, when Michael appears to spin himself around. We were all amazed at what we got away with in there. That one turned out to be very simple, but in some of the others, we haven't been so lucky."

By far the hardest shot for both Ralston and the optical team was the one referred to as "the Pizza Shot", which begins with an overhead shot of a large pizza in the center of a kitchen table in the McFly home of the future, as three sets of hands reach in and each take a slice. The camera pulls back, revealing Fox playing the 47-year-old Marty, his son and his daughter arguing and interacting in a single continuous shot that lasts two thousand or more frames! In the course of the shot, Marlene nonchalantly slides a pitcher of tea across a split to Marty Sr., who pours some across another split into Marty Jr.'s glass, and then Junior downs the contents!

Since the choreography of the three split elements was among the most complex in the film, this elaborate setpiece took three days to shoot. To let off steam, Ralston and his crew kidded each other about how funny it would be if everything got jostled right in the middle of the shot—and perhaps someone was listening. "The day after we finished the shot, an earthquake hit and actually moved everything," Ralston laughs.

Robertson had the unenviable task of handling the optical compositing of the pizza shot, which is on-screen for so long, it's conceivably the most difficult in the film. "The pizza shot is about 2000 frames straight through, with Fox playing three characters who are constantly interacting," Robertson says. "There was an intense amount of experimentation going on. Frequently, when you're trying to do a sequence as complicated as this one, you'd shoot it in little sections and tailor different parts of the set to each. The problem here is that essentially all three passes on the set and actors are there in the same shot. The biggest problem is trying to keep track of everything."

"The way we decided to think about this so we didn't drive ourselves nuts," Ellis adds, "is that one of the plates is on the bottom, and the others are on top, so the splits define the foreground and background, rather than thinking of them as fitting side by side."

"In this case," Robertson continues, "we've tried to think of it as three layers: Marty Sr., Marty Jr. and Marlene. Thinking of these shots in this way enables us to reveal a particular part of one scene while hiding it with another, which simplifies things for us in one sense, but complicates it in another. Sometimes we'll decide that we'll have a piece of the tablecloth or a table matte as part of Marty Sr's scene, but as we work through the scene, we might find that for some reason something has to come out from under that matte, so we would have been better off selecting the table from Sr's scene and using the tablecloth matte from Marty Jr's pass! Trying to figure out where we have to be later in the shot is like playing with a Chinese box. We're working with Pat Myers in animation. We really have to guess right to begin with or we have to go back and remake things."

In addition to the split photography, there were a number of interesting blue screen sequences, usually employed when the time traveler revisits scenes from the first film. "They actually set up the whole 'Johnny Be Good' scene again for this film," Ellis relates, "and had Marty watching the scene from a catwalk above. Most people would've used a double to walk across that catwalk, but we decided to film a background plate of Marty walking across the catwalk and add a blue screen shot of Fox playing the guitar. If we did it right, you'll assume it's a double

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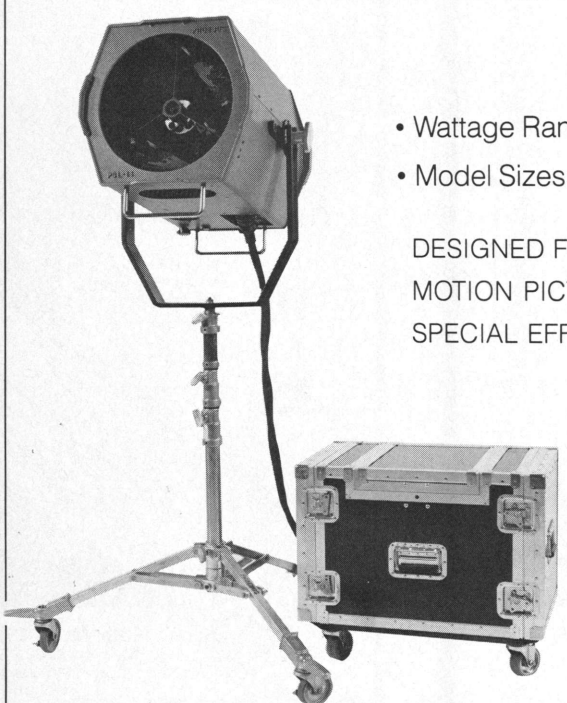

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and that Marty was actually on the set playing the guitar and not blue screened in at all. Those shots were tricky because we used a painted blue surface on the set instead of regular blue screen, plus they were done with the Vistaglide system so they could incorporate pans and tilts and dolly-ins. In spite of the problems, they turned out pretty good."

As things worked out, Ralston hadn't had time to properly test the Vistaglide, so virtually every shot using the system was breaking new ground. "For much of the shooting I was saying, 'God, I hope this works!'

Even as he neared the end of post-production on *Back to the Future Part II*, the tension and driving pace never let up for Ralston, which begs the question: Why do filmmakers get to spend four days to shoot a single shot, but the effects artists are always pressured to have the film finished yesterday?

"This has been the hardest year of shooting a film I've ever had," Ralston admits. Most distressing for him about this predicament is knowing that while he's finishing up the post production on *Back to the Future Part II*, Scott Farrar is shooting plates on *Back to the Future 3*. "If I'm doing a show, I want it to have my personal touch," Ralston says, "even though it's getting harder and harder to do that every year. Personal touch? There's hundreds of people working on this film, but if I'm with Bob at critical times making decisions that are vital, it means my approach to a shot is felt more than anybody else's. That's one of the few creative moments I have - after that, it becomes a technical nightmare."

As in another famous series, the *Star Wars* trilogy, the second *Back to the Future* doesn't really have an ending - it's a cliffhanger. Unlike *Revenge of the Jedi* however, which audiences had to wait two years to see, *Back to the Future 3* will be in theatres next summer, six months after *Back to the Future Part II* 's Christmas release. And what do the coming attractions look like? "It's a Western," Ralston smiles, "a very weird, weird Western." ▲

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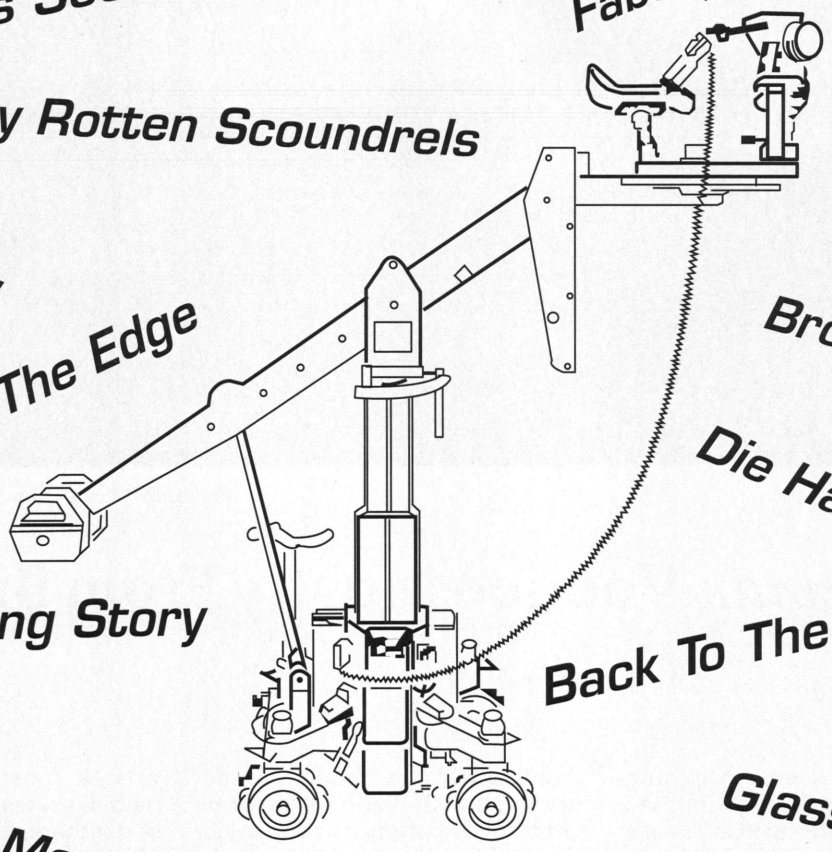

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Batman Voodoo Mostly From Britain

by Ron Magid

Effects artist Derek Meddings' contributions to many fine Hammer films and the British *Thunderbirds* and *Supercar* television series made his name respected abroad, but it was his work on the first three *Superman* films and in the James Bond series—including *Live and Let Die, The Spy Who Loved Me, Moonraker* and *For Your Eyes Only*—which brought him international recognition, and ensured a place with the greatest effects artists of all time. Now *Batman* soars because of Meddings' breathtaking work.

Meddings was hard at work with production designer Anton Furst on the ill-fated *High Spirits* when he was approached about doing the elaborate effects for Tim Burton's *Batman*. When Meddings was hired, he recommended the production also bring Furst aboard as production designer, which made for a happy working experience and a splendid looking film. "Anton designed everything and my crew and I just copied those designs in our models and miniature sets," Meddings says. "As the production designer, Anton had a special idea of how things should be done and how they should look."

Meddings spent nearly nine months preparing and shooting *Batman*. While it may sound like quite a commitment to some, *Batman's* lengthy production schedule was a welcome relief to the workaholic effects man. "That's the sort of film I like," he admits, "because I don't have to worry about looking for work for a while."

Once Meddings set to work, the first order of business was to construct the elaborate models necessary to sell the reality of Gotham City and Batman's amazing assortment of bat-gadgetry, including the Batwing plane. The model crew had the privilege of building miniatures for sequences no one would guess featured miniatures—for example, when the Dark Knight, with Vicki Vale, escapes his evil pursuers by shooting a bolt up into an overhead catwalk. "The live action part of the shot had them lifting up off the ground, so they just left the picture," Meddings recalls. "The rest of it we did as a miniature: we built the top part of the alley with the buildings Anton had designed. We built a gantry and just pulled our miniature Batman and Vicki figures, which were something like three inches in height, up on wires.

Then we had a lot of smoke in there and steam coming out of the pipes, which had to be lazy. That was the main reason we shot at 120 frames per second. If we shot it past that speed, we'd get very fast-moving smoke and it didn't look right. I've spent all my life shooting at 120 frames a second. If the camera's running at 24 I think there's something wrong with the camera—it doesn't sound right," he chuckles.

"I gather from the write-ups that a lot of people who saw the film weren't aware just how many miniatures went into it," Meddings says proudly, "which is a compliment to us. If people can say 'Now, that miniature you did,' if they can spot it, we've failed, because it should all go together and nobody should be aware that they're miniatures."

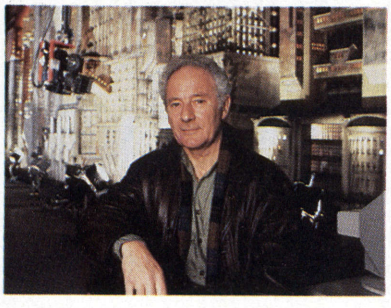
In keeping with this philosophy, Meddings achieved a rather remarkable blend of live action and miniature effects photography in the sequence where the Batmobile crashes through the gates of the Joker's factory hideout just as the factory blows up. "We did that as a split miniature," Meddings reveals. "We built the factory as a miniature, and used an area of Pinewood Studios dressed up to look like the entrance to the factory for our live action sequence. Then we just composited the model in on the top of it. It was a very simple split really. When I say simple—nothing's simple. You've got to get the right balance. Again, we couldn't do the shot using a foreground miniature, because we had to shoot the factory blowing up at 120 frames a second. If we had built it as a foreground miniature, it would have slowed down all the foreground live action, so the Batmobile and everything else would have appeared to be moving too slowly."

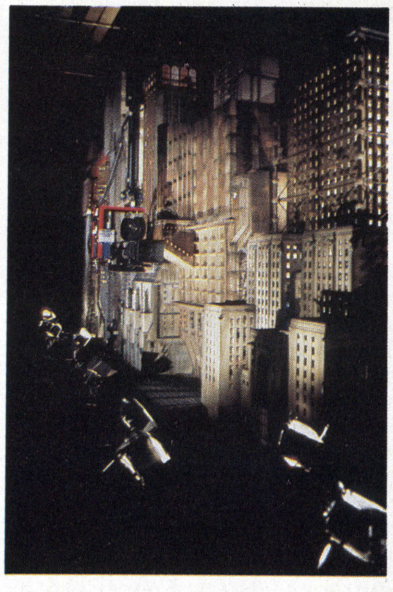
The epitome of the Dark Knight's genius, the Batcave, was visualized by production designer Furst as a dark, bottomless, twilit region somewhere deep under the earth. Meddings' crew supplied a number of truly impressive matte paintings to augment the beautiful set that had been built at Pinewood, and to help bring Furst's vision to the screen.

"Dear old Anton did a great job," Meddings says, "but of course, like all of these shots, they couldn't build the whole cave, nor could they get the proper depth in the cave. So all the shots where you see the entirety of the cave were done with several matte paintings. There were a number of different camera angles. We had three people doing them. One painting was done outside by Doug Ferris. Ray Caple did some, and one of our boys, Leigh Took, did about three of them, and he was a newcomer to the team! We did them all on glass—the sort of old way of doing it."

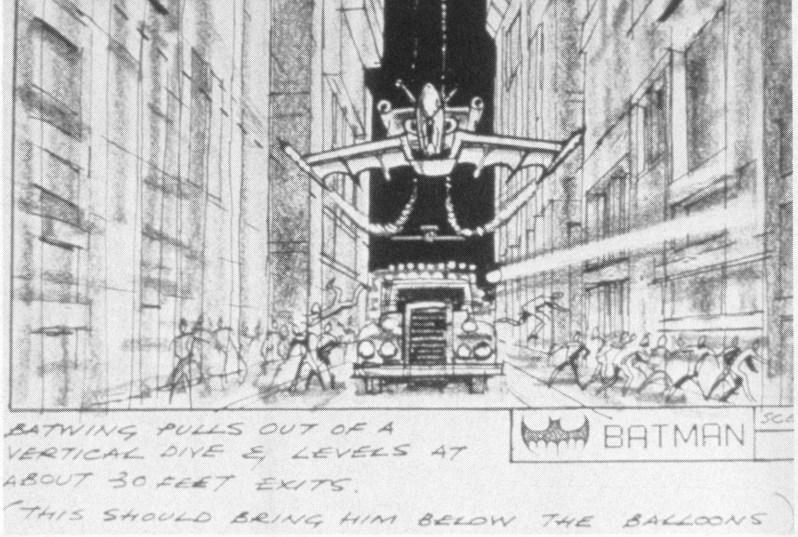
One of the most exciting shots in the film for fans of the Batman comics was one in which a bit of cartoon animation was used unexpectedly to create the effect of looking down on Batman standing on a ledge from an impossibly high perspective. The shot had a wonderfully stylized look to it that immediately created the appropriate comic book mood. "That was a very tricky shot," Meddings admits. "When I originally saw it was written into the script, I kept ignoring it because I didn't know what to do. I thought that on the day we actually set it up, I would think of a way to do it!

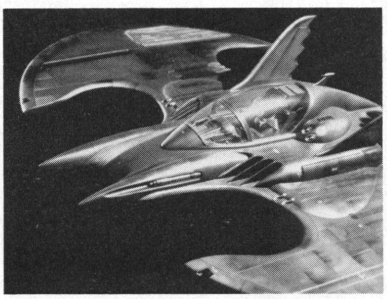
"We were shooting down the height of our 35-foot cathedral model, which we had laid on its side. Originally, we rod-puppeted a miniature Batman—we had him turn and appear to walk back into the cathedral out of camera view. It worked, but it didn't. It nearly came off. So we decided to use cel ani-

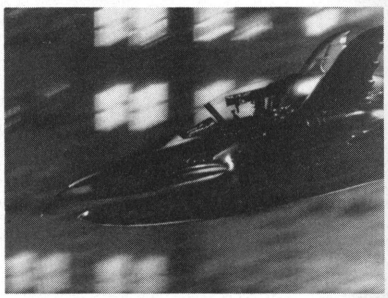




Opposite page: ***The film's signature shot. Above: The Batmobile makes its remote controlled exit from Joker's industrial base of evil operations.*** **Left:** ***Derek Meddings and the motion controlled snorkel camera. Scale buildings fill the background.***







Three shots tracing the development of the harrowing flight of the Batwing: An original storyboard, the model Batwing, and the final composite.

mation, which was done by one of my boys who's into animation, Peter Chang. He's a very clever animator, and he also added all the lightning and steam effects to the shot. The bottom of the shot was a matte painting."

Meddings considers the miniature set with its 40-foot backdrop somewhat small by his standards, compared to similar sets he'd built for *Santa Claus—the Movie* and the *Superman* films. "On those films, it was easier because we could just photograph New York and use a very large transparency—sometimes 60 feet across—as our backdrop," Meddings says. "But in this case the backdrop had to be an entirely hand-done painting because the skyline of Gotham City was so unique."

Working over a four month period, Meddings' son built a large, 1/12 scale miniature of Gotham City's main drag for the scene in which the Batplane zooms through the corridor of skyscrapers. "The buildings in the Gotham City set were quite tall," the elder Meddings recalls. "They were all about 19 feet high, and the street was very narrow because we wanted to create a claustrophobic atmosphere."

The narrowness of the miniature streets created a series of problems for Meddings' crew when it came time to shoot the Batwing's flight through Gotham City. "We couldn't use a snorkel," Meddings explains, "in that shot where the plane flies over the parade and comes very close to the cathedral but then peels off and misses the cathedral. When we laid the shot out roughly just to try it, we realized we were going to have problems. When we started to do the bank, simulating the Batwing's veer to the right, the snorkel hit the building. We ended up building the motion control camera rig so as it travelled down the street, it was actually climbing. That was just as good as using a snorkel really. Fortunately, there was supposed to be a climb in that shot."

The Batwing crash was actually shot live action at 120 frames a second, with the model flown on wires. "We had little charges in it so when it hit the road, we could explode the charges—Whish!—blow off the wings and do a certain amount of damage. The trouble was it had to match with their live action shots where the wreckage of the Batwing was scattered on the cathedral steps. We would have liked to do our shots first, but they did their part first because the schedule didn't quite work out, so my big problem was to get the Batwing model to actually end up on the steps of the cathedral in the same place as the full scale mockup, facing the same way."

Meddings' crew built two different scale plane models, one for the long shots and one—and only one—for the crash: "For the very long shots, we had a 1/12 scale Batwing, which was very small, it worked out to be only 6 inches across. Then we had a 1/4 scale Batwing for the crash. We only had one of those. It took so long to build, what with the schedule and the time and also the budget, we had to get the crash with one Batwing. But in actual fact, we didn't get it in one! We got most of it in the first shot, but we needed other cuts to make it convincing, so we had to repair the Batwing within a half day and do it again."

The film's signature shot was done in miniature and then optically composited. In it, the Batwing hovers in front of the moon, over a sea of clouds that seem to have drifted in from a Maxfield Parrish painting. "I painted all the clouds for that," Meddings says. "I used the old trick of painting on plastic so we could get a really jet black sky and put all the stars in. First, I sprayed the clouds onto plastic, then we put dacron clouds in front of it, like the old cotton wool, and lit them from underneath. To add the stars, we wound back the film and shot them separately, so all the stars look nice and clear. It was Anton's idea—a great idea."

For the film's climactic battle between the Joker and Batman inside the cathedral, Meddings built a 35-foot deep miniature belltower, into which various objects—a churchbell, Vicki Vale's shoe, one of the Joker's henchmen—would fall. "Though our model was 35 feet in height, to give it a real feeling of depth, we photographed it, then reduced the photograph and put it on the floor," Meddings explains, "so the end of the model was a photograph. The henchman who fell down the stairs was shot blue screen and then matted into the shot. The only tricky part was putting it together! Fortunately, I've got two optical lads who are really very good at it, Neil Sharpe and Anthony Hamilton. It would drive me crazy, it's too mechanical, but they just loved it.

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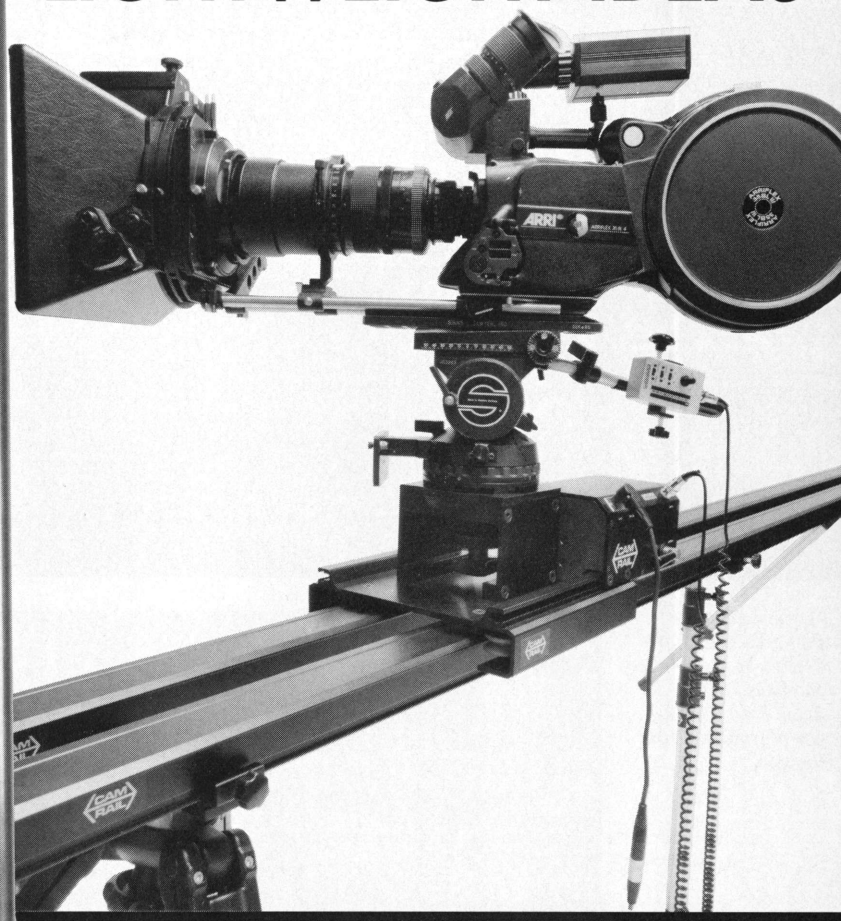

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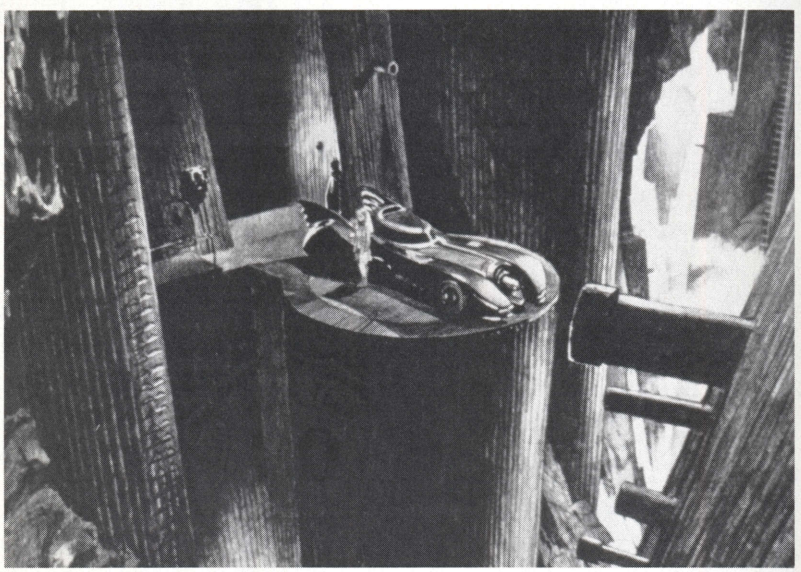

Above: ***Composite shot with miniature Gotham amid matte paintings.*** **Right:** ***Anton Furst production illustration of the Batcave.***

"If I can get away without using blue screen," Meddings admits, "I do. As much as I love the process, there are always times when some little thing goes wrong. You don't quite get it put together properly. It's become an art form now, and it's being used more and more. I think people are getting more professional at putting these together, but when I worked on the *Thunderbird* series, there was no way that we could put opticals into an hour-long program—we only had 10 days to actually shoot those pictures. So ever since, whenever I can do an in-camera optical, I do it. One of the reasons is I love to see rushes the day after the job is completed.

"When you do blue screen, you don't see anything for three months. I'm always a little nervous until then because although I think I've done everything right, there's always that chance that something didn't quite work. If you're doing an in-camera optical, you see it the following day. If there's something that's not quite right with it, you can go back again and do it very quickly."

Consequently, the other objects which plunged into the miniature belltower, like Vicki Vale's shoe and the churchbell, were miniatures in scale with the staircase model. They were dropped through the set and shot high speed, live action. "The bell was a real brass bell that we found somewhere, so of course it had terrific weight to it," Meddings relates. "We just let it free fall. It was so heavy that there was no way it was going to bounce off the miniature staircase, which was made out of a very light, soft wood. We lined the heavy bell up on a quick release, so that when we let it go, it just went down and took all that staircase away with it as it fell, shattering the whole lot.

"We had three cameras, shooting at 120 frames a second," Meddings continues, "because it wasn't something we wanted to try to do twice! It was a nicely built miniature and to do it again would have been quite a task. When you build something like that, you box yourself in. The miniature had to be very strong and supported all the way around so there would be no shake to it when the bell hit the staircase. Once it was built and painted, we couldn't get in to work on it again. If we ever had to touch anything up—sometimes you see a little piece of white wood that hasn't quite been painted—we had to do it with a paint brush on a long stick.

"Getting the three cameras in position was the biggest problem" he adds. "We had one camera looking down the shaft and two cameras cunningly hidden behind pieces of the staircase, looking up. We had to make sure those cameras weren't spotted by that high shot."

The ultimate battle between Batman and the Joker occurs on the ledge above the cathedral, where Batman and Vicki Vale hang on for dear life as the Joker's henchmen attempt to rescue their leader with a rope ladder hanging from a helicopter. "That sequence was all done with miniatures," Meddings points out. "They only used the real helicopter for the close-ups. They put it up on a big rostrum on the backlot at night and they shot the inserts of the goons looking out of it and throwing the ladder. Everything else was

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done with our miniature helicopter, which we flew on wires. It was about five feet in length. and had a built in motor that worked the rotor, and flashing lights.

"Since we were shooting at about 96 frames per second we had to have a motor that really made some revolutions, otherwise the rotor would have appeared too slow. We put a tiny unit inside the model to release the ladder so when they cut to the wider shot of the helicopter you see the ladder drop. The miniature ladder was made of very fine nylon, and all its rungs were made out of lead so it would have the proper weight when shot at a very high speed. When they were hanging on the cathedral and the ladder in long-shot, again we had very small, three inch figures of Batman, Vicki, the Joker and his goons."

The film's memorable final image is of Batman standing atop a huge building as the camera moves up and up and up and the Bat-symbol blazes in the night sky. The shot was accomplished via a clever blend of miniature and blue screen photography, and animation. "We laid some miniature buildings on their sides, then we placed the camera on a crane and tracked up the buildings. Then we did some soft dissolves so we could go from the live action building to our miniature building, because the shot started in the street below. The camera in the live action shot moved up as far as it could, then we took over and soft dissolved the upper part of the building in. Then we traveled up further, went over a gantry, and did a soft dissolve into Batman, who was shot blue screen, live action. Finally, the clouds and the Bat-symbol were put in afterwards with animation."

Meddings, a 35 year veteran of the movie business, grew up around the studios in England and always knew he wanted to work there. "My mother was a continuity girl and stand-in for Merle Oberon in one part of her career, and my father was a master carpenter at the studio, so of course I wanted to be in the film industry," he smiles. "I trained as an artist—not a very good one—but I knew I wanted to make movies. After I did my two years national service in the air force, I managed to get a job at Denham Laboratory painting titles to films, which drove me crazy because I hated it. But it was a way in. Then I was very lucky, because I met Les Bowie, the great effects man, and he took me under his wing. I wanted to train as a matte artist, and he said "Right, join me." So I worked as Les' assistant for many years, and the first films we did were all Hammer films."

Had the choice been left to Meddings, he might have remained a matte painter, but the economics of the British film industry at the time didn't provide steady work for matte artists, so the young apprentice began to learn the tricks of the effects artist's trade from his mentor, Les Bowie. "I thought the process of matte painting was absolute magic," Meddings explains, "but unfortunately, in England at that time a matte painting cost 100 pounds and film companies couldn't afford it unless they were making a big picture, so there always came that time when there wasn't any work in the matte painting department. But Les, being a very versatile man, used to get involved in doing miniatures, so we would do them together.

"When we didn't have any minatures to do, he used to take me out onto the sets and we would do the live action. So I had a really good grounding and I learned from Les all the tricks that I'm doing now. He did them years ago.

"Les was never really appreciated, unfortunately," Meddings sighs. "One of the unsung heroes. It was very unfortunate that he died at the end of *Superman*. I don't think he ever knew that he won an Oscar. I remember when I was quite young and I was doing the *Thunderbirds*, he used to say to me, jokingly, 'If you ever win an Oscar before me, I'll kill you.' And we won it together on the *Superman* picture, and he never knew."

Meddings may go down in the annals of film history as the man who bequeathed super powers to more screen heroes than any other, from Superman to James Bond. Ironically, he rarely enjoys the films that have given so much pleasure to his fans. "The only reason is, of course, I'm too close to them," he explains. "If I see the film six months after I've done it and I've forgotten what I've done, then it all comes up as a nice surprise. But *Batman* I really did enjoy. Safe to say Les Bowie would be very proud of his apprentice." ▲

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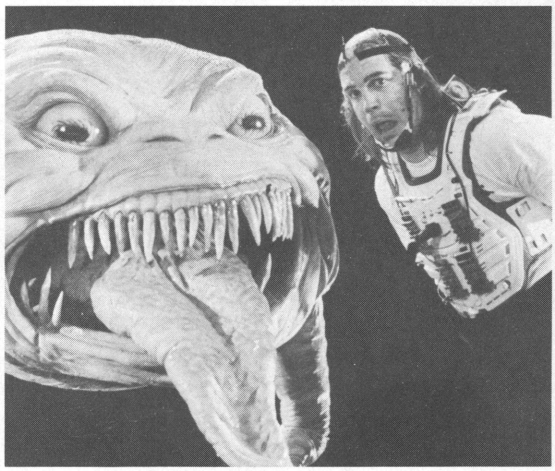

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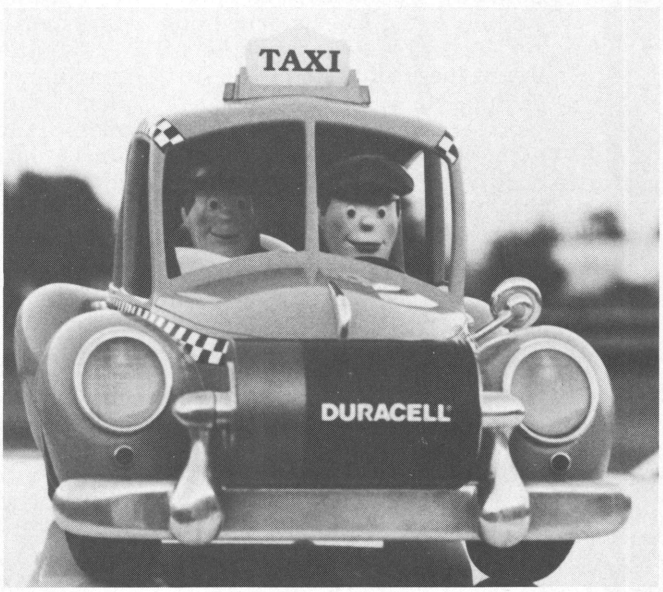

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Effects Maestros Put Buckle in Indy's Swash

by David Heuring

While planning a certain shot for *Indiana Jones and the Last Crusade,* visual effects supervisor Micheal J. McAlister needed some information on how to rapidly deteriorate clothing without using dangerous acids. He called an association of dry cleaners, who referred him to a clothing damage expert in Utah. Utah sent him to Mary Baker, who is employed at the textile research facility at the Smithsonian Institute. McAlister explained his situation and asked for any advice. The reply came: "Have you tried ILM? They can do anything." After a chuckle, McAlister responded: "Ma'am, we *are* ILM."

As it turns out, Mary Baker was involved in preserving Yoda for the Smithsonian's traveling exhibit on *Star Wars.* Eventually she came out to ILM to train the crew in the handling and use of the acids, which were involved in *The Last Crusade*'s climactic disintegration scene. But the anecdote reveals much about the prevailing attitude towards Industrial Light & Magic: "They can do anything."

Recently, McAlister took time out to discuss some of the Byzantine special effects techniques used in *The Last Crusade,* which do nothing to tarnish ILM's superhuman reputation.

It's a long road from imagination to the screen, and plenty of routes work. The design phase of an effects shot varies from film to film, and from shot to shot, but there is a general flow that most follow. The director and an artist create storyboards from the script. Those storyboards are brought to ILM for comments and discussion of how best to accomplish the shot. "Sometimes they've done a little conceptual art," says McAlister. "But with Spielberg that doesn't happen too much, because he's pretty familiar with the way we work, and realizes that we've got plenty of art support up here. But he will come up with a general concept.

"On this particular film, the amount of preproduction art work was pretty sparse. The script was being rewritten right up until the last possible second, in fact, beyond the last possible second, and then we had the writer's strike and a bunch of other things that came into play.

"But there were certain key sequences that Steven knew he wanted—for example, he wanted an air chase, and in that air chase, a dogfight that takes place between three different airplanes. Indy ends up crash landing, and jumps into a car, and the chase continues between two airplanes and a car. One airplane is lost in the tunnel sequence, and then Indy ends up wrecking the car. Indy and his dad then run down the beach on foot, chased by the last airplane. So in some cases Steven already knew what he wanted.

"Then it becomes a question of who was going to do each shot in the sequence—whether they would try to do it practically, air to air footage, or air to ground footage, and how much of that was too dangerous, or too time consuming, or too difficult to control. We then divided up the work on the

Opposite page: ***Frame dupe showing Indy and his father inside the tunnel, being chased by the flaming Messerschmitt.*** **Left:** ***From the "abyss sequence". Changing the angle on the bridge sets it off from its background and breaks the illusion of invisibility.***

basis of how to make it look the best, how to do it cheaply, and how to do it safely.

"For instance, there was some discussion of trying to do the fire tunnel crash sequence real, full scale. This is the sequence where the airplane crashes into the entrance of the tunnel and the wings snap off, and the burning fuselage continues through the tunnel, and ends up passing the car, going out the opposite end of the tunnel, and exploding.

"We realized that first of all it would be horrendously difficult to do, especially in a location like Spain where you don't have all the support and materials. But the main consideration was the danger of putting real people in a old tunnel with fire and explosives. So almost immediately it was decided that there was no way to do that practically. So the ball fell in ILM's court.

"We had a variety of ideas for how to do this thing. We had three different camps with three different ideas—somebody had the idea of putting human beings on a go-kart and letting them go through the fiery tunnel, hoping that there was no crash. Of course, that sounded too dangerous. We had an idea of using pulleys and dead weights, suspended up in the air. By suddenly letting the weight go, the airplane and the various cars would be propelled through the tunnel just by the force of gravity. But that didn't seem very controllable.

"So what we ended up doing was building a kind of slot car arrangement, which gave us the versatility of being able to change the shot as needed in editing. We put a false bottom in a long set floor, with a slot running the length of the floor. Through that slot went a metal bar, and underneath the floor of the set was a big endless loop of stainless steel cable. The set was 210 feet long. At one end of the loop was a pulley holding the cable and at the other end was a motor, so you could turn the motor on and the loop would go around.

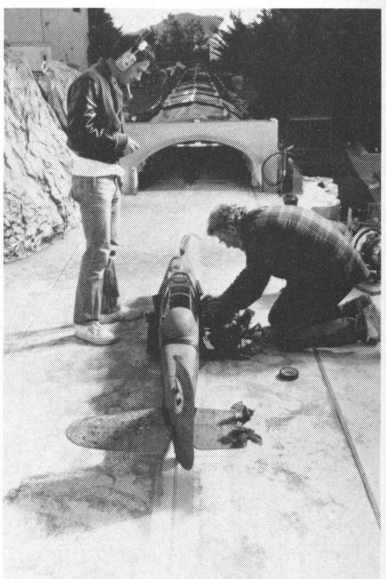
"The metal bar was attached to the cable and to whatever model we were moving through the tunnel. So you'd go one course, then back it up and shoot it again. The connectors on the cable had a quick release, in case we had a crash—the car would be released and the cable would slide through the bar without tearing everything up. There was a different cable for each vehicle. The camera car was one vehicle. The car that the miniatures of Indy and his dad were riding in was the second vehicle, and the burning Messerschmidt was the third.

"We were able to drive all three vehicles with one motor, to save money. We changed the relative speeds by changing the size of the pulleys. The camera car is the slowest of the three. Indy's car eventually overtakes the camera, and the airplane is faster than both of those—the airplane overtakes the car and the camera. So it was a little tricky," McAlister understates.

"Because we don't have any stages that are 210 feet long, we shot the sequence out in the parking lot. We took up about 14 parking spaces for a couple months—which ticked everybody off, including me when I couldn't find a place to park. But it was worth it," he chuckles.

The mechanism resembled a 210 foot banquet table with a slot in the middle. The set pieces themselves, which formed the actual tunnel, were simply half-cylinder sections, eight feet long each, hinged on one side. The tunnel could be opened like a chest freezer at any point along the line to make adjustments, perform repairs, adjust the lighting, start the plane on fire, etc. "The lighting was attached to the inside of the sections so that when you moved the tunnels up you were also moving the lights up," he explains. "So everytime you set the tunnels back in there was a little bit of tweaking that had to be done. Someone would have to crawl in there and see if the lighting was right. They'd literally lie down on the camera platform—the camera sled was about four feet long and two feet wide—and we'd slide 'em down the tunnel. It was pretty fun to film."

Although some aspects of shooting the sequence could be described as fun, anytime you have fire, high speed photography, and



Top: ***Each eight foot section of the tunnel was hinged to facilitate tweaking and touching up.*** **Above:** ***Modelmaker Mike Fulmer sculpting the stolen car that Indy and his father use to elude the Messerschmitt.*** **Right:** ***Dave Heron (in headphones) coordinates activities at each end of the tunnel for the shot in which the Messerschmitt loses its wings. Chief pyrotechnician Bob Finley, Jr. rigs charges to go off just as the plane hits the tunnel.***

high travelling speeds, something's bound to go wrong. "You miss your cues, or you crash, or the fire doesn't go out, or the fire doesn't start, something jams—there were lots of mishaps. But for the most part, it worked very, very well.

"I think the most complicated shot in that sequence was the second shot, where the airplane crashes into the mouth of the tunnel and loses its wings. The camera is inside the tunnel looking out, about ten feet from the entrance. The airplane flies towards camera and crashes into the face of the tunnel, and the wings have to break off and explode. So there were a number of things that had to be timed just right on that shot.

"Mind you, because of frame rates, everything is happening 2-1/2 times as fast as it appears on screen, so you don't have very much time to look at it and be sure it worked. If it seemed like everything was right on a take, we would stop shooting for the day and wait for dailies. We tried to have video assist, but we didn't want to drag power cables through the tunnel just to power up the video, and any sort of remote control video didn't work because the tunnel walls were made of foil—too much interference.

"The camera had to be at exactly the right spot when the plane crashed into the walls. The plane had to start out above the ground, and once the wings hit the walls, it had to crash down to the ground and bounce. The wings had to break off at just the right impact point, and the explosions that take place as the wings break off had to happen at exactly the right moment. Otherwise, it would look like the wings broke off and then it exploded, or it exploded and then the wings broke off, or the wings broke off and it exploded, but the plane hadn't hit the wall yet. Obviously, there's a lot that can go wrong.

"Again, there were several ideas on how to do this. We tried to trigger each part by hand, but human reaction time was about five times too slow. Even if you're anticipating when you want to fire the explosion off, you're usually too late or too early. And we can't really afford a lot of practice runs.

"So instead, we rigged a series of dead wires. By screwing a wire to the far end of the set and then attaching that wire to the explosives on the airplane, the explosions were automatically triggered when the end of the wire was reached. Also figured into the length of the wire is the time it takes for a fuse to blow—in other words, an explosion doesn't happen the moment it's triggered. There's a delay time for the signal to travel through the wire, and so on. Still another timing consideration is the speed of the plane. It gets very complicated," McAlister deadpans. "It's the kind of thing that could've taken us 12 takes to do, but for that particular shot we guessed everything right and got it on the first take."

The fire tunnel sequence was done mostly on the miniature sets, but some elements were done in optical. There were several shots that involved foreground blue screen elements of Harrison Ford and Sean Connery in the car with the fiery fuselage behind them.

"Part of the challenge of doing this scene was the fact that we were dealing with flames in miniature scale," McAlister continues. "As you know, whenever you shoot something in miniature scale, you have to overcrank the camera to give the object the right weight, the right inertia, the right scale. And so the combination of having to shoot high speed for the flames, and also having to move the camera *and* the car *and* the airplane fuselage through the tunnel very quickly, to make it look like it was a chase scene, meant that we had to achieve some pretty high speeds.

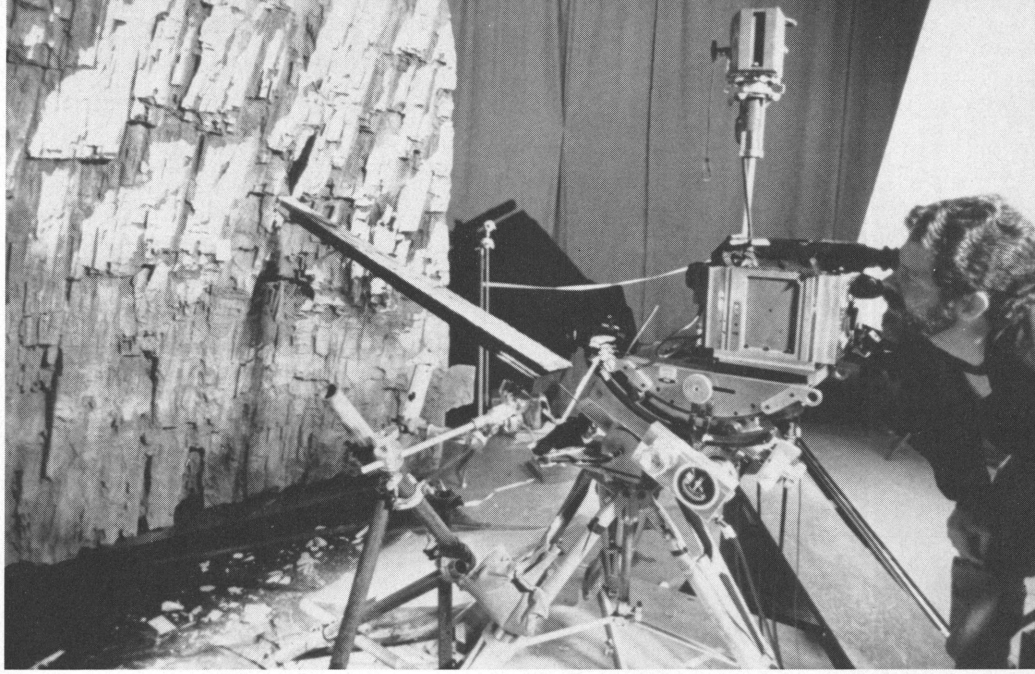
"As it turns out, we were

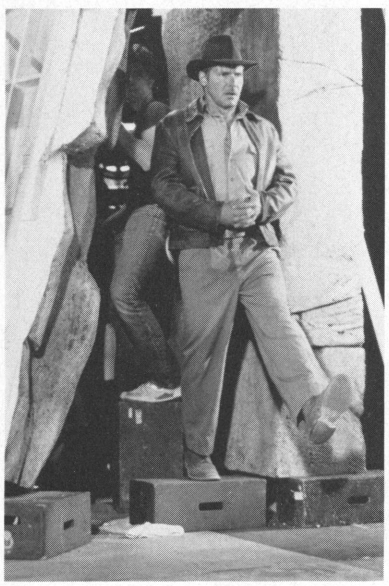
working in approximately quarter scale, which is pretty big. Flames just don't look good if you go any smaller scale than that, because a lick of flame is a certain size and it begins to diminish the scale on your model. Because we were shooting at anywhere from 48 to 60 fps with the VistaVision camera, we ended up having to hit speeds of 30 mph with our little models, in order to make them look like they're traveling quickly once you slow the film down."

At the very end of the air chase—by this time it's down to Indy and his dad on the beach and one airplane shooting at them—Indy's father gets into the act by scaring up a flock of seagulls, which fly up and clog the engine of the plane, causing it to crash. "Again, there was a lot of discussion on how to accomplish this," recalls McAlister. "They were going to attempt something with real seagulls, but they couldn't figure out how to catch enough of them, especially in the season where seagulls don't roost in Spain. So ultimately those shots were passed onto us, more or less by default.

"Some of them were done with balls of feathers that were glued together with hot glue. It was literally just a blanket of feathers with glue poured over it. After it dries, you end up with a bird shaped glob of feathers that streaks through the frame so fast that you can't tell it's not a real bird. It just has the color and texture of a bird. Also, some of them were done with little toy wind-up birds. You wind them up and release them, and they literally fly, just like real birds. Still others were done just by going out to the dump and filming real seagulls against a clear sky, and matting them into the foreground of a scene where the airplane's coming straight at the camera."

Flaming fuselages in high speed chase, an invisible bridge over a bottomless gorge, a villain who ages 400 years in ten seconds—seamless though these scenes may be, we know by their nature that they are "effects shots". Often, though, the invisible hand of a good effects house is at work in less obvious and expected sequences. McAlister describes a scene of the latter type: "We've got a shot of a zeppelin at an airport terminal. It's the first time we see it, and rather than just a sudden cut to the hero's POV, Steven wanted a dramatic reveal in the course of a panning or dollying shot. He realized my technical considerations were more limiting than his general staging or blocking ideas, so he said, 'Okay Mike, figure out a way to reveal this zeppelin in an interesting fashion and come back to me'."



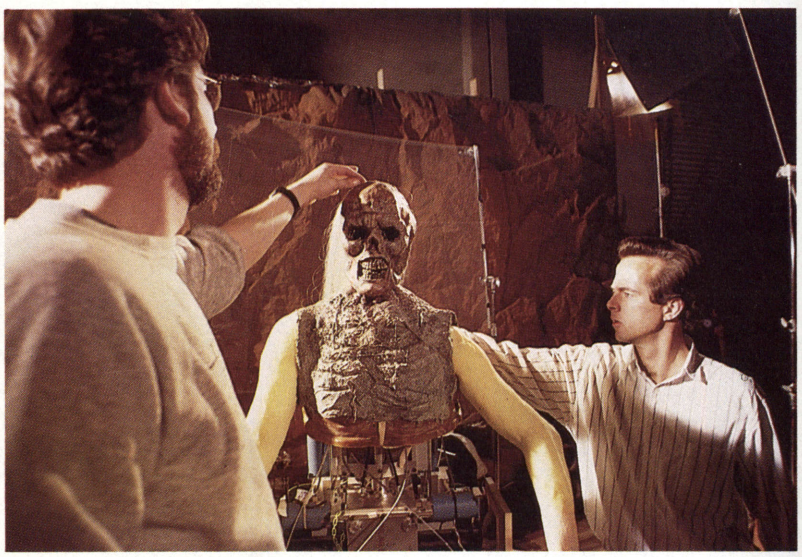


"So I came up with an idea that I never would have considered in my right mind," he chuckles. "It involved two wild crane moves, one against a foreground and one against a background, using the foreground characters of Indy and his dad as they come through a turnstile inside a building. The camera dollies back with them, they turn a corner, and the camera follows them, panning and booming up as they climb a flight of stairs. They go through a doorway at the top of the stairs, and out this doorway is the zeppelin.

"First we went out to an airfield, where there were cars, an airplane and a big field of grass—but no zeppelin. We built a facade of the staircase and the doorway out on the airfield, and I set up the camera on a crane with a 20 foot boom. The scene was rehearsed with stand-ins, so I could get an idea of what the move was going to look like, the pacing and everything. Then we tore down the facade, and did several versions of this move—completely wild, no actors in the scene, no staircase, just doing a boom move of the field with a few cars, the airplanes and some extras.

"Then when it came time to do the foreground, we built a set

Top: ***Matte cameraman Wade Childress lines up the "abyss" shot. The painted bridge must line up perfectly in order to blend into the background pattern and become invisible to Indy.*** **Left:** ***A rather innocuous-looking applebox recreates the terrifying chasm Indy must cross on the invisible bridge. Assistant cameraman Pat Mcardle is at the focus wheel.*** **Above:** ***Matte painter Yusei Useugi creating the chasm.***



Above: ***Victoria Lewis with the star of the "Donovan's destruction" scenes.*** **Right:** ***Effects supervisor Mike McAlister (right) and Stephan Dupuis with the elaborate motion control device that gave Donovan's torso lifelike convulsions.***

that matched the facade that was built at the airport, blocked the scene as it had been rehearsed out there, and shot it against blue screen. Normally, this wouldn't be attempted, the idea being that there is no way that the two images would match, because there was no motion control—it was like doing two takes on a dolly move. Human beings aren't repeatable.

"My idea was, using our motion control optical printer, we would be able to take one of those two elements, and rephotograph it in such a way that it would match up to all the bumps and peculiarities of the the other element.

"The move was designed in such a way that it was panning and tilting and booming and trucking for the first two thirds of the shot, but then at the end of the shot, we're doing nothing but just trucking straight forward through the doorway. By the time we're full frame on the doorway and the door jambs go out of frame, the camera has settled down. At that point, there's no more adjustment required on the VistaVision background. So it was a bit of a trick in that we were able to use the middle portion of the VistaVision background—the shot of the field that was being seen through the doorway. We were able to move that all around without having to worry about the frame lines, because the foreground was blocking the frame lines anyway.

"Since you weren't seeing the full frame of the background for most of the shot, we chose to use the foreground element as the 'control'—the background would be matched to it, making the adjustments within the VistaVision frame. John Alexander spent hours and hours and hours match-moving the background, marrying it up with the foreground. It was an amazingly difficult thing to do.

"Once John had married the background and foreground, it came time to put a zeppelin into the shot. We took our still photograph, a transparency of a zeppelin, and put it on an animation stand. John was then able to project the plate and do a matched move on the zeppelin, so that it married into the background. It was very exciting when we saw our first successful composites on that.

"This shot was really a case of us being on location and having the director say "this is what I want to do". There's no way that an art director in Hollywood could figure out how to do that sort of a shot, because it's very peculiar to the equipment and techniques that we use. Designing a shot like this is one of out-of-the-ordinary services that we are able to provide," McAlister says.

A familiar special effects technique came into play for several shots—the tried and true matte painting. After a feverish chase between Indiana and the enemy tank which holds his father, a battle to the death takes place on the tank's treacherous outer surface. Indy and his rivals become so intent on their swashbuckling that they fail to notice that the driverless tank is grinding inexorably towards the edge of a cliff.

The danger of shooting the scene with an actual cliff precluded a practical approach, and the problem fell into the able hands of the matte painting department. The crew followed their forebears' footsteps to an area that at one time served as a huge backlot for the Italian film industry—the Costa del Sol region of Spain. After coming across several deserted Western sets, the unit found a plateau in an area of dry riverbeds which lent itself to conversion to a cliff. The shots were made from the tops of nearby hills, and later certain areas of the plateau were painted out, leaving the tank and its villainous cargo to a nasty fate.

The ancient (in film terms) art of matte painting was invoked by the ILM team for several other scenes. In one case, Indy's worthiness is tested by a series of trials at the entrance to the sacred caves which house the grail, the object of this installment's adventures. The third riddle requires of the aspirant a literal leap of faith, onto an invisible bridge across an infinitely deep and spectacular chasm. Spielberg's conceptual description of the shot asked the matte painter to imagine that his art *was* truly ancient. McAlister explains: "Steven originally described that shot to be 'as if there were a matte painter alive 2000 years ago who saw this bridge, and wanting to hide it, painted the top of it to blend into the background.' That's literally how he described it to us, and that's literally how we did the shot. Except we didn't have a 2000 year old matte painter—we had Paul Huston.

"At the end of a very narrow tunnel is this huge gorge, and it looks to Indy like there's no way across the gorge. There are opposing cliff faces, about 50 feet apart, with a hole in each face. He needs a bridge, but he doesn't see one. It turns out that there really is a bridge there, but the optical illusion has rendered it invisible. The bridge is painted and designed in such a way that it blends in perfectly with the background on the far cliff face, and is therefore unseen. So Indiana must take a big leap of faith, jumping out onto what he thinks is air. Only then does the camera pan around so the audience can figure out what's going on. When the bridge is broken out of its perfect blend with the background, we can see that it actually exists.

"It was a fairly simple matter, conceptually, to say that the top surface needs to blend in with the vertical striations on the background rocks. Paul, after sculpting the background cliff, literally looking through the camera, painted the bridge to blend in perfectly. We actually accomplished the effect the same way it was supposed to work in the story.

"It's like one of those postcards you used to get in the Sixties, the kind where you look at it one way and it's one thing, but when you move your head back and forth, it's another. The bridge was painted in to match the background, so it's invisible to the camera. We reveal it by booming over to the right. Suddenly the bridge is visible. Once we move back to the original axis, Indy's POV, it disappears again."

When the intrepid archaeologist finally reaches the inner sanctum, where the grail itself is housed, he finds one last trial awaiting him. There are at least 30 different cups, with no way of knowing for sure which is the actual grail. Legend has it that a sip from the one true cup gives everlasting life—something the Nazis find quite interesting. Jones only wants to heal his father. The catch is that drinking from the wrong cup brings an equally dramatic, but opposite, reaction: instant (and spectacular) death.

In what could be construed as an allegory to the endless idea-stealing of the film business, the bad guys, capitalizing on Indy's resourceful riddle-solving, have followed him into the chamber, seeking to reap the prized grail. Moments after the villain takes a deep draught from what he believes is the actual cup, we realize that he has made a fatal (to say the least) error. Enter ILM and Mr. McAlister:

"He thinks that he's suddenly become invincible, but then his stomach starts to hurt, and his face starts to distort, and it turns out that he ages 400 years and crumbles into dust, immediately, right before our eyes.

"Initially this sequence was attempted in England, most of it by a series of cuts, using different kinds of puppets and prosthetics, and an actor with make-up. For one reason or another, Steven wasn't happy with the way it worked out. So Steven and Michael Kahn salvaged as much as possible of that footage, and built a sequence from it, leaving only two shots for us to do.

"The first shot takes the bad guy from the point where the prosthetic makeup left off, and turns him into a skeleton. So basically it's a man who looks about 90 or 100 years old, shriveling up, decaying and turning into a skeleton in about 7 seconds, the whole thing being on camera, with no cutaways.

"The first things we did for that shot were storyboards and art work. This was one of those sequences that needed all the planning and design ahead of time, because we needed to know exactly what we were attempting to do before we embarked on build-

A stand-in for Alison Doody watches "Donovon's destruction" in this series of frame dupes.

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ing puppets. It was probably two months in design. In order to accomplish this thing on-camera, we settled on a combination of motion control puppet heads and computer graphics morphing."

A mold of the actor's head (made up prosthetically to be 90 years old) already existed, and it was brought over from England. The ILM creature shop took a mold of that head which represented the starting point of the shot; the end of the English effects and the beginning of ILM's. The rest of the shot was divided into three stages, and three new puppet heads were sculpted. The British mold served as the starting point, and each successive head was designed to be more deteriorated than the last. The new heads employed a series of cables, pulleys, levers, radio controlled motors and vacuum bladders to give them the ability to physically shrivel.

"The idea was to have purely mechanical effects begin the disintegration on each of the heads, and once there was a visual lead-in, we could go into some computer morphing and tricky dissolves. This was to keep the whole effect from simply being a dissolve from one head to the next. There needed to be plenty of realistic movements right off—so that the audience would hopefully buy the fact that this was happening before we started tricking them.

"The first head was designed to take him from 90 years old to about 130 years old. We took a mold from the ending pose of the first head and sculpted a second head, to begin where the first head left off. We then changed the hardware inside, so we could make it decay even more. The cheeks and temples were hollowed in more, the eyes and nose shriveled up, his eye sockets sucked back into his head, that sort of thing.

"By the end of the second head we were basically into a skeleton that has a sort of crust of skin left on it. Then we did the same thing, taking a mold of the last position of the second head to make the third head. The third head doesn't really have any structural or bone changes or flesh hollowing out. Instead, it shows the process of the skin being eaten away, crumbling, drying up and turning to dust. Then we had to figure out how much of the shot was going to be taken by each head," explains McAlister.

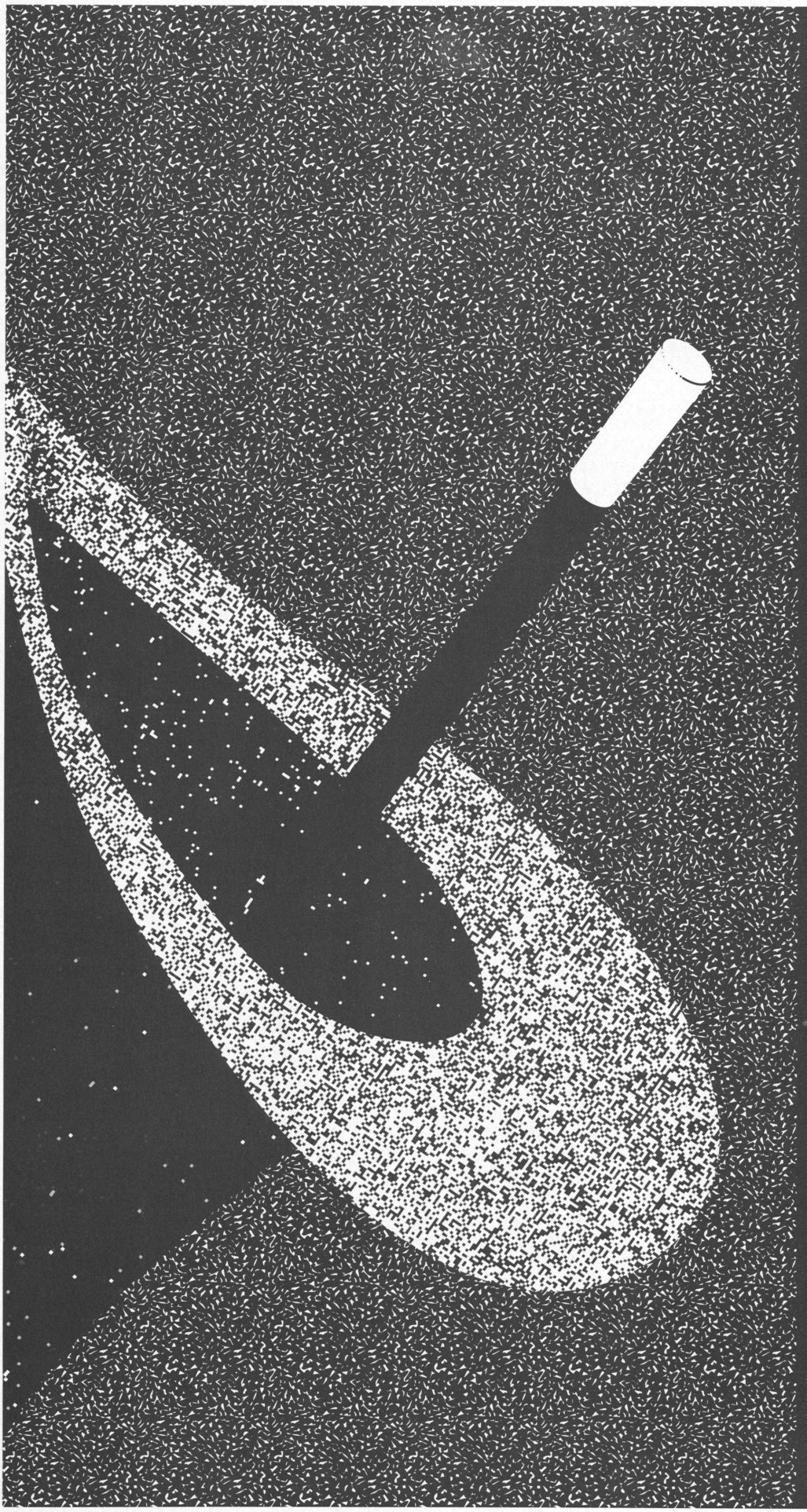
"I was afraid that if we didn't make a body for him, with shoulders and a neck, it would end up looking like a head on a stick—looking like an effects shot. The object was to give it as much realistic movement as possible, so that the audience would buy it, based partially on that fact that the guy was writhing in pain.

"So we developed a very elaborate motion control device that represented the man's torso and his neck. With all this motion control, all these motors and cables and whistles and bells, we were able to simulate very realistic head movement, with the head bending forward and backward, and turning and leaning to the left and right. We had the ability to make the shoulders shrug, or make the torso bend at the waist. We spent days and days programming so he could be writhing in agony while all of this was happening to him," relates McAlister.

"When we shot each of the puppet heads, we planned to use each head for about a third of the shot. But we filmed the entire 7 1/2 seconds with each head anyway. Then we looked for particular areas within each shot which made sense as transfer points. A big gesture of the head, for example, would help to disguise the transition from one head to the next."

A quick version of the entire aging sequence was then put together in optical, to make sure the shot was on the right track, and to see how the spacing and timing looked. After approval from Spielberg, the shot was sent to the computer graphics department. Computer morphing techniques and programs developed for the transformations in *Willow* were used and expanded upon. "Morphing" is the computer application which helped smooth the transition between the final frames of one head and the beginning of another. McAlister elaborates:

"At the transition points, the heads are similar, but they are still two different heads, so certain things are not going to match. They won't register perfectly—either the eyes would be slightly misaligned, or the shape of the scalp would be



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slightly different, or the ear would be in a slightly different spot—so the transition would be noticeable. The dissolve would be between similar but slightly different images, and the audience would see that.

"Using the computer morphing techniques we can actually change the shape of one image so that it fits exactly within the following image. Imagine two slightly different silhouettes. Morphing allows you to alter each of the silhouettes in such a way that they meet in the middle, and conform exactly to one another. It's somewhat analogous to a fun house mirror—you stand in front of a convex mirror, and you're suddenly tall and skinny, or a concave mirror, and you're short and fat.

"Another way to picture it is this: Imagine a photograph on a piece of rubber, with the edges of the rubber fastened down to a table. You put your finger on the middle of it, and sort of squish it and move it to one side. You don't change the image in terms of what's there, you just change the shape of it. You stretch one part of it, you compress another part, and by doing that you can actually move the features around a little bit.

"We did hours and hours of that stretching and moving and squashing, in order to get all the different features to line up perfectly from one head to the next. We're to the point now, where, when you dissolve them together, you don't notice any shape changing. There's a bit of a texture shift or a color shift that's very gradual, but it looks like aging. It appears that the head itself is changing, rather than changing to a new head.

"The morphing is combined with a dissolve, giving the effect of a two dimensional dissolve. It's a 'shape dissolve', where one shape dissolves into another, as well as an 'image dissolve'. In a one dimensional dissolve, you're just taking a house and you're dissolving it over a bridge, for example. You see the bridge bleed through the house and then suddenly the bridge is there. In a two dimensional dissolve, the first thing that you would notice is that the house starts to take on the shape of a bridge. By the end of the dissolve, the house is "bridge-shaped". In a two dimensional dissolve, not only is the color and the texture of the bridge replacing the color and texture of the house, but the shape of the bridge is replacing the shape of the house. It's rather effective.

"The other important consideration in the design of this shot was that it is actually an over-the-shoulder shot. The camera is looking past the actress [Alison Doody]. So all of this disintegration is taking place in frame with a real human being, who's acting at real time. So she had to be matted into the shot. The problem is that she has wispy blonde hair, and the villain has wispy blond hair, so any sort of blue screen work was out of the question.

"These puppets were all filmed against a real background, with real smoke, and she was filmed against the same background, with real smoke. Using a complicated series of mattes, the computer graphics guys were able to isolate the girl and the various puppet heads from their respective backgrounds and combine them."

It's worth mentioning again that those elements were combined in the computer, not in optical. Anyone with doubts about how the computer is changing the special effects business, consider this: the only opticals done for this amazingly complex shot were the reduction from VistaVision to four perf and the addition of some foreground smoke. Other than that the entire shot was composited in the computer graphics division.

Although the special effects of Industrial Light & Magic seem to be more dizzying and spectacular each time around, McAlister claims to feel no pressure to "top" anyone. "I don't feel compelled in any way to create a more spectacular or difficult effect than you saw in the previous film. What I try to accomplish are effects that are invisible, so the audience doesn't know that they're seeing an effect. And I try to do it making the least possible number of mistakes, cheaply, and on time and on budget. That's really the challenge of the day. It's the writers and the producers and the directors that have to come up with something new, different and exciting that will blow the audience away." ▲

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Photos by Jim Alling

Gantry Secret Weapon for *The Abyss*

by Ron Magid

A flock of futuristic mini-subs races towards a thin, cigar-shaped outline—a sunken Trident submarine—2,000 feet below the ocean's surface, coming closer and still closer to camera. The refraction and halation of the mini-sub's high intensity lights shining through water currents and dense flurries of minute debris would convince the most hardened skeptic of the reality of the image. The shot lasts some thirty seconds. This pleases *The Abyss*' effects supervisor, Hoyt Yeatman, no end. The shot just described was one of dozens of breathtaking dry-for-wet effects masterminded by Yeatman's effects house, Dream Quest Images.

From the outset, Yeatman knew that the trick of making *The Abyss*' elaborate visuals work was creating dry-for-wet effects shots of mini-subs that could be intercut with live action shots of the full-scale subs swimming through the ocean. "The idea of underwater photography and dry-for-wet has been done in other films," Yeatman says, "but usually the effects didn't have to intercut with live-action footage. The way *The Abyss* was to be done, we were going to have a tremendous amount of real underwater footage to intercut with effects shots of the larger vistas or of maneuvers the full scale subs couldn't do. The director, Jim Cameron, made it clear the look had to be identical—it had to be a seamless blend."

Cameron, who also helmed *The Terminator* and *Aliens*, is a former special effects man himself, so he knew exactly what he wanted from Dream Quest Images: perfection. "That must be frustrating, trying to get that out of all the people he has to work with," Yeatman muses. "Jim definitely has vision and he knows exactly what he wants. When we first talked about this project with him and he started describing the imagery, it became clear he wanted a real, honest-to-goodness look. It wasn't going to be a lot of movie light or moonlight underwater look, he really wanted realism. Cameron wanted to see the light from the mini-subs lighting up the areas underneath them, and light wrapping around objects creating a lot of silhouettes, so we soon realized that ordinary effects techniques like traveling mattes weren't going to work in this case—it's very difficult to get the lights from the separate elements to interact with themselves or other elements such as backgrounds. For example, if you have a separate element with a beam of light coming from it, how do you stop it at a point that will eventually be the background? It was a nightmare even to think of making traveling mattes to do that. In this thick hazy environment where the lack of light, backlighting and interaction of light plays so important a part, it's very difficult to get matted elements to work because mattes look like mattes."

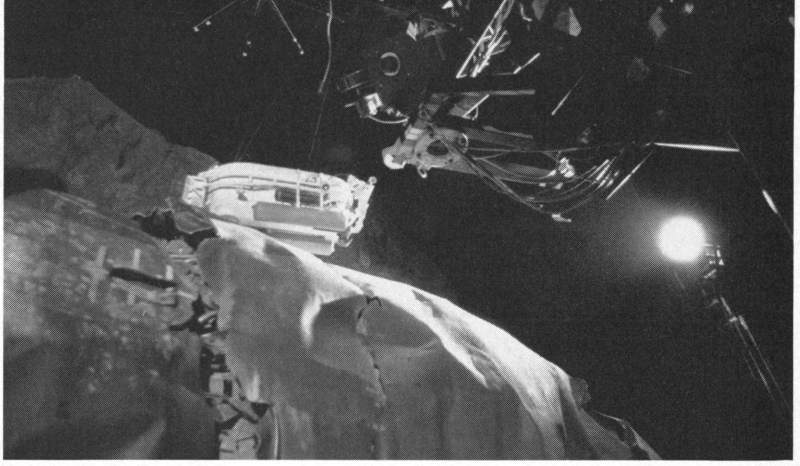
Yeatman recognized that creating this seamless blend of effects and live-action photography would require a very special motion control rig, one capable of handling several models at once to eliminate as much as possible the need for telltale opticals. The scope of some of the shots necessitated that the rig be of relatively vast dimensions. After months of intensive research, Yeatman's multiple motion control rig, dubbed

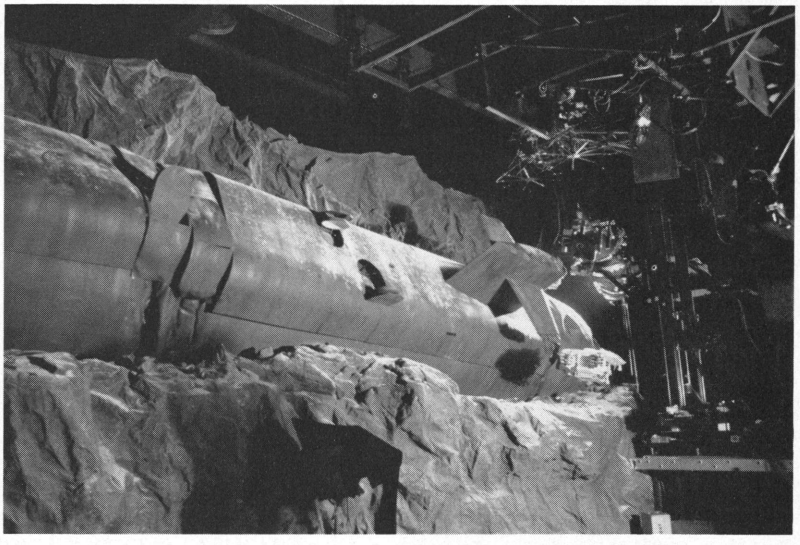
"The Gantry", was born. "The Gantry didn't spring so much from inspiration as from necessity," he explains. "Before the project started, we did our homework, 'cause I figured I never wanted to try to reinvent the wheel. We researched other camera rigs that had been built in the past to get an idea of what worked and what didn't. There was a system called Elmer which was a gigantic twin-towered thing Disney put together for one of the Epcot displays, but it was never really successful. An English group called Oxford Scientific created the Cosmoglide camera rig, which consists of a large I-beam construction on the ceiling, leaving the floor open for real time devices. It's a very clean system, and we used it as a jumping off point for the Gantry because it didn't have a bunch of track on the floor."

Yeatman envisioned a system which, unlike the Cosmoglide, incorporated three separate axes of movement: up-down, north-south and east-west. To determine just how big the Gantry's motion control rigs would have to be, the enterprising Dream Quest Images crew built various submarine models out of foamcore, put them on sticks and began playing with the scale.

"We started with the idea of using real computerized bridge cranes like the ones NASA uses," Yeatman recalls, "but they're huge, very heavy and designed to carry tons whereas we wanted something that could carry a few thousand pounds. We were looking at supertankers, but what we really needed was a ballerina. We eventually decided to fall back on normal motion control equipment, things we were familiar with."

And so Dream Quest Images constructed a free standing 65' overhead gantry, consisting of three bridge cranes riding on Lintec rails, and installed it on its own soundstage. "The Gantry took approximately two months to build," Yeatman says proudly. "It's probably the largest motion control stage in existence: 110' x 70'. The stance is 65' square. All three bridges can travel 40' up and down, 20' east-west and 6' north-south, and we can move each of these three bridges independently of each other over this area. I'd like to credit Tom Hollister and Mark Hollister, who masterminded the mechanical aspects of the system and did quite a bit of electrical-mechanical engineering to get the thing off and running. It's one thing to build something and another to debug it and use it. We spent the last year using it on *The Abyss*.





Photos opposite page, left and below left *show models strung up like puppets from multiple points. The gantry system is capable of moving three objects independently at the same time. Course is plotted on the computer and the graphics become perfectly repeatable each time.*

"The camera is a conventional motion control type camera rig," Yeatman continues. "It has pan-tilt-roll, north-south east-west and it travels along a 16' track on the floor. We took a little different approach with it, however, by mounting it on a cart that would roll by hand for some shots. This allowed us to move the camera up to the position we wanted, and lock it down, which enabled us to move it around independent of its floor track. In other words, the camera was on the floor and the models were on the ceiling, so we could pass over the top and so on. We also built offset arms for each bridge to compensate for certain limitations, so one model could pass another."

The special demands of *The Abyss* effects—there had to appear to be layers and layers of 'underwater' diffusion obscuring models and flaring lights—required more miniature puppeteering than traditional motion control work, so Yeatman designed the Gantry as the world's largest puppet theatre, using the star puppeteering rigs developed by Tad Kraznowski of ILM for *Batteries Not Included*. "We'd all seen *Batteries*," Yeatman says, "and we were impressed by its use of marionettes pretty much designed for real time applications. Each one of the Gantry's bridge cranes incorporates a Kraznowski star marionette with roll, pitch and yaw. It's nice that we're playing with submarines instead of fighter planes so we didn't have to do any barrel rolls!"

In keeping with the "everything happening before your eyes" approach, Yeatman realized that the various miniature minisubs would have to be virtually self-contained live-action effects pieces, complete with fully functioning external lights and a rear-projection system to create the illusion that divers were moving about inside the subs. This created its own share of problems for model-

maker Dave Goldberg and the electronics wizards, who were faced with the challenge of cramming a lot of gear into as small a package as possible. "Running power down lines of music wire is very difficult because it isn't a good conductor for electricity—it turns red hot, glows and then breaks!—so we decided to make everything onboard each of the models," he recalls. "We did a lot of experimenting with different types of batteries and lights until we finally found a certain set of nicads that would work and a globe that would hold up for the duration of our shots.

"We knew the exposures we'd be shooting at, and we wanted to design the ships to be as small as possible, and still have enough room to get everything we needed inside: batteries, RP projector, everything. On board the miniatures were radio controlled servos that could be controlled through the motion control system just like a stepper motor, a technique we developed for the Michael Jackson *Moonwalker* video. We had 32 channels running, so we could make the subs' tail fins maneuver as if they're steering. We needed batteries to run the RC and the lights, so where battery tubes existed in the real subs, we used those for battery tubes in the miniature. The mini-subs turned out to be just under 24", which was quite remarkable considering they were completely self-contained.

"The All Effects Co. built special 35mm fixed-pin RP projectors with very wide angle lenses," Yeatman adds. "The little RP projectors were about 10" long. Everything was fixed pin and it had a cooling system, a light system and an advance system, so it worked real well. It carries 30 seconds worth of background film, which was just long enough for some of our shots! We also built a miniscule lens on each sub because when we looked inside the full-scale subs underwater, there was a distortion caused by the interface of water and air, which created a reduction in the size of the image. To simulate that, I took two hemispheres and filled it with liquid parafin, which is like baby oil and has the same refraction as acrylic, and used it to make a lens, so when we intercut between the real submersibles and the models, they matched."

Dream Quest Images's excitement over being able to fit all their effects equipment into a two-foot, 1/8 scale mini-sub soon vanished when they realized just how big a 1/8 scale Trident submarine model would be. "We said, 'Oh, Jeez!' when it turned out to be over 70' long, which is huge!" Yeatman laughs. "We were wondering if we could even build this thing, when we realized we could cheat the scale and cut about ten feet off, without anyone ever knowing it. The problem was if the sucker was 60' long, which is what it turned out to be, how were we going to get from one end of it to the other in a single shot without building another gantry that was 80' or 90' square? We ended up building the entire 60' long by 20' deep by 20' high model on a kind of rolling float, so we could roll the whole miniature around. That allowed us to work on more than one shot at a time. It was always stationary when we shot, but it moved anywhere we needed it, so we could angle it under the bridge cranes."

A number of elements conspired to shorten the length of time Yeatman's crew could use to shoot the miniature subs, especially the burnout factor of the batteries and lights. Yeatman realized he could save both if he didn't burn the lights for the entire time they shot a particular sequence, since the shutter of the camera was closed half the time as it was advancing to the next frame. "The camera wasn't seeing anything since we were shooting continuous shutter, mimicking real live action," Yeatman explains, "so we made each model smart: we put an electronic package inside that allowed each model to communicate with the computer through the nine wires of the star marionette rig. Two of these wires were insulated at the star, and through them we communicated high impedence data - we would send up to six channels down each side of the model. This enabled the computer to tell the model when the camera shutter was open, so the lights could go on and off. This increased our ability to shoot by two times, since the lights would burn only half as long.

"The batteries had to be changed many times between passes," he adds, "which was kind of delicate. We'd stop, take the batteries out of the battery tubes, reconnect the new ones and put them back in. We had a barrage of battery chargers on set—it looked like some kind of slot car heaven!"

To augment the lighting on the models, Dream Quest employed several small Pepper and inky motion picture lights up in the gantry area. "We are making movies," Yeatman says, "and the director wanted to see this big expanse underwater, where it was really supposed to look like the subs were lighting everything, so we had to augment the model lights. We would shoot those small overhead lights in a no-smoke, completely clean environment with some slight diffusion on the camera."

The gantry's ceiling was also filled with the fan systems and ducting necessary to control the pressure and density of the smoky atmosphere on-stage. "We were holding very accurate densities for hours at a time in a large area," Yeatman emphasizes, "so we needed a very elaborate smoke control system to handle it. We had to be able to pull smoke in and out so we could control the density as exactly as possible."

In addition to the murkiness of the smoke, Yeatman employed a shifting color scale to create the illusion of the subs swimming out of the murky depths toward camera. "If the ship was very far away, it would be very blue," he recalls, "but as the model came toward camera, it became more neutral looking, and we could do that independent of any other production elements that happened to be running. Each of the subs had individual focus lights, so we could focus the beams or flood them, and they also had gel holders, where we added the blue filters. The subs that were farthest away had the most blue and those that were closest had the least. We generally designed the shots so the subs in the distance remained in the distance, but we did one shot where we changed the filter and cross-dissolved from one filter to another for a very long, deep perspective shot.

"We had to do quite a bit of testing at the beginning to get a vocabulary going with the smoke," Yeatman adds. "We usually did several smoke passes: some were done with very heavy smoke, others were shot in less smoke with diffusion on the lens. We noticed that the lights in a lot of the live-action full scale sub photography had definite beams, accompanied by a greenish-aqua colored flare around the lights, so we mimicked

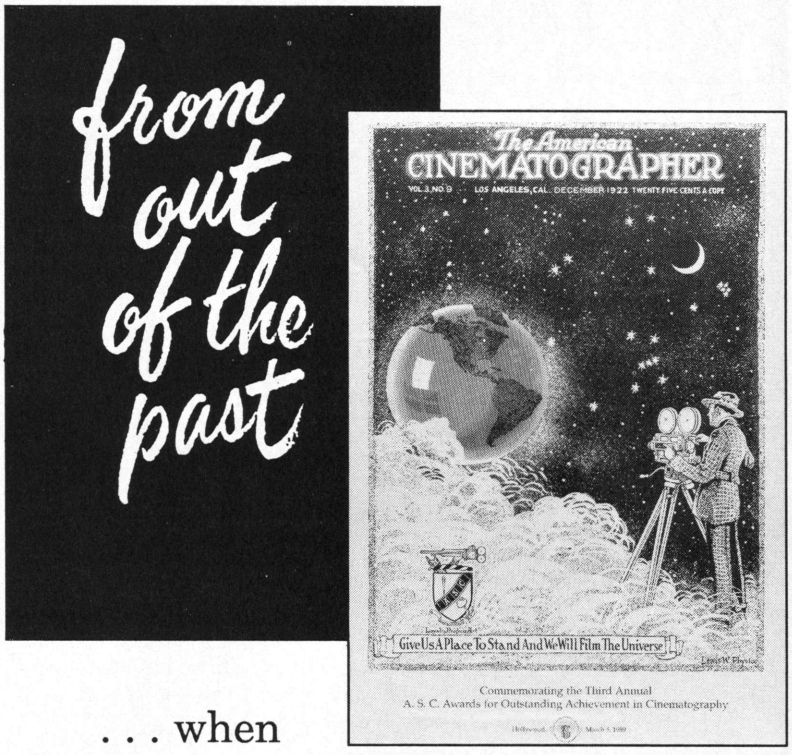
that by shooting our models in less smoke and adding diffusion. Sometimes there were so many permutations and combinations you could go crazy, but it was really quite neat.

"For example, many times when we had shots with lights coming toward camera, they looked underwater-murky until the sub turned away, but then the image suddenly looked too sharp and clean. To correct for that, as the ship was turning, we cranked the exposure up on just the smoke pass, therefore increasing the murkiness. One nice thing about motion control is it allows you to change the exposure time during a shot — you're not locked into one set exposure, and as the exposure changes, the whole system slows down proportionately. We had to do a lot of fading in, fading down on all our imagery to give a cohesive look to the thing. It worked real well."

Hiding the marionetting wires was a problem to a certain extent. When they became backlit by the smoke, the wires showed as dark silhouettes. "To correct for this," Yeatman says, "we did a separate pass on the smoky atmosphere without the wires, and we were able to get some really interesting designs. Another technique we used was to hang our models upside down or sideways and rotate the sets accordingly. We could really fool the audience that way, because they'd never look for wires underneath the model!"

For most of the general exposures on the mini-subs, the Dream Quest crew would begin with several clean air passes involving the augmented motion picture lights shining down on the model from the ceiling, and the rear projection elements. "The rear projector was shot alone in clean air in a separate pass," Yeatman says, "so later we could swing the color towards more or less blue in optical. It was then double-exposed inside the model and the atmospheric perspective haze was laid over it."

Yeatman is quick to credit the miniature photography and programming crews who actually put the splendid visuals on film. "We had a day and night crew working," he recalls. "The day crew consisted of Mike Bigelow, Mike Arias and group, and they did the programming. The night crew, Terry Moews and Mike Talarico,



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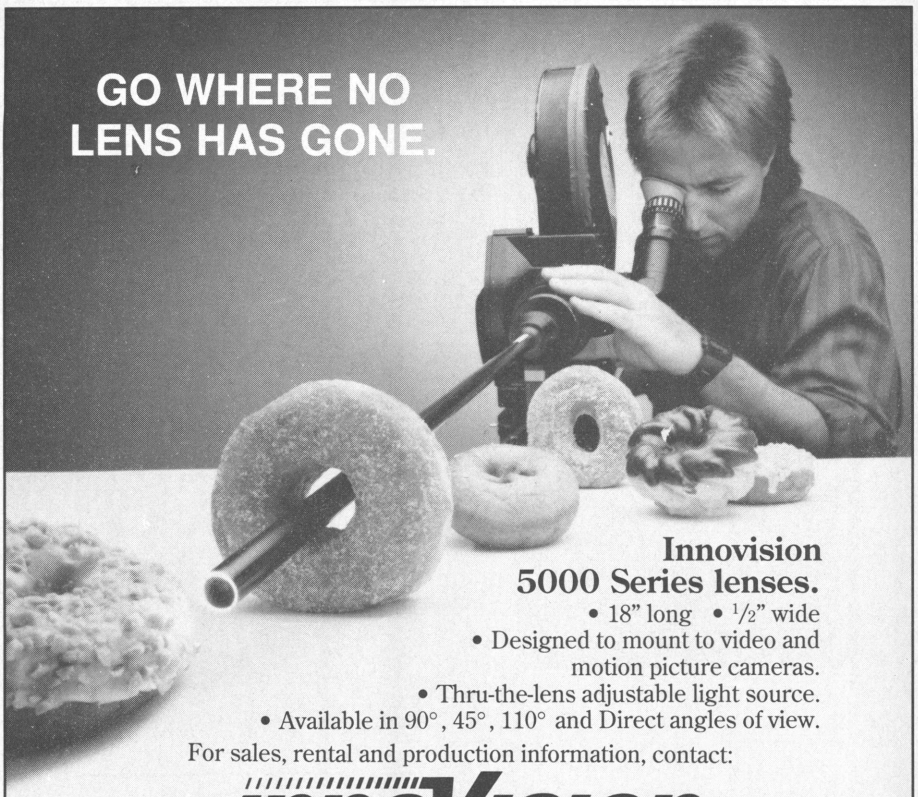

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was the shooting crew—they're the ones who did the color wedging and the actual production runs. It took anywhwere from eight to twelve hours to shoot each sequence."

The booth that the camera people worked in was on four wheels so it could be maneuvered easily about the large gantry stage. Inside the control room was a mouse driven computer system with 32 axes of drivers for the gantry and a separate computer which controlled all the servos inside the subs and the RP projectors. Needless to say, Dream Quest employed a lot of video assist and a time lapse system. "The JVC video assist was connected to the CCD camera on the motion picture camera," Yeatman explains, "which was very helpful, especially during the many times the camera was 12' or 15' in the air — it was very awkward to get your eye to it. This also allowed us to do a lot of video move tests, which are really quick to do. We just clicked the models along as fast as the rig would move, then played it right back. If we liked it, we'd do an 'RAR': a record and reconnaissance black and white test, which would be used for final analysis on the big screen before we did our production shot. It was the biggest train set you can imagine," he laughs jubilantly, "especially since we were creating whole scenes unto themselves instead of separate elements. We had the whole vista to look at. It was great!"

Prior to the release of *The Abyss*, Dream Quest Images was regarded as a "poor man's ILM" - but no longer. Whatever the critical reaction to the film, one thing is certain: Dream Quest Images has arrived. As for other applications for Yeatman's revolutionary gantry? "I could see doing something like Star Tours in 3-D," he posits. "I don't think we'll be doing that much more hanging model work, but it will be very handy for hanging a snorkelized camera from the ceiling, which will give us total freedom to fly anywhere we want over very large landscapes. However, I think it'll predominantly be used as a camera lifter," he smiles, "and if you ever want to do another underwater picture, we're all ready to go!" ▲

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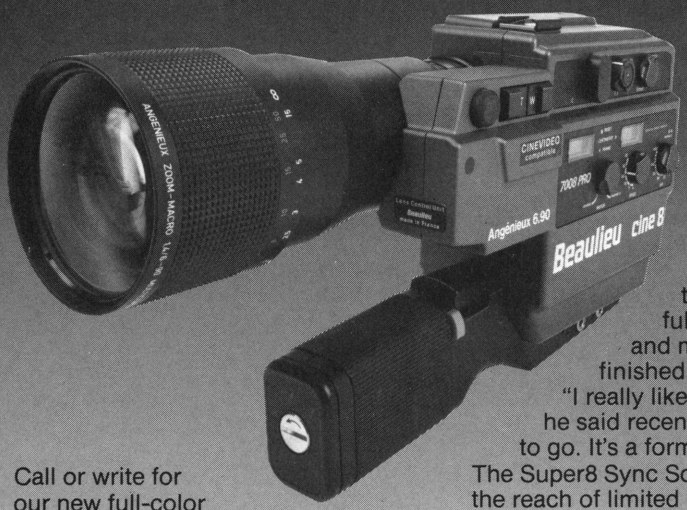

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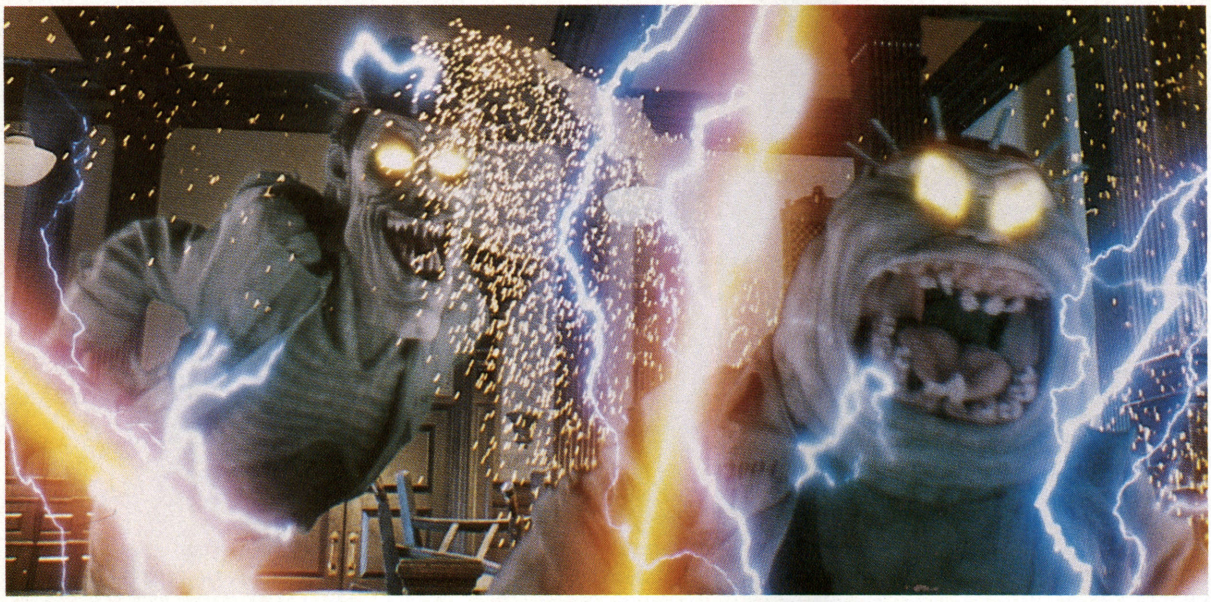


Photos by Kerry Nordquist

Busting Ghosts—Job That Keeps Returning

by Ron Magid

When Industrial Light and Magic contracted to create spectral special effects for *Ghostbusters II*, there was no intention of breaking any world records, but by turning out over 170 effects shots in about six months, it was quite a record nonetheless. "*Ghostbusters* was done in less time than any other effects show," chief effects coordinator Ned Gorman affirms, adding proudly, "We started doing concept art on the show in August of 1988, and we started shooting with the first unit in late November. They finished at the end of February with reshoots in March.

"We didn't get most of our cut sequences until mid-January, and to complicate things, there were conceptual changes right down to the wire," recalls effects producer Janet Healey. "We were changing and adding shots up to three weeks before finals, but we knew it was going to be like that going in. Nobody had any illusions about how tight the schedule was, including Ivan Reitman, who directed the first *Ghostbusters*, and Michael Gross, the executive director.

One of the major reasons for the success of the effects in *Ghostbusters II* despite the major time crunch was the caliber of talent involved. Effects supervisors Dennis Muren, ASC and Mark Vargo were individually responsible for creating some of the most startling effects images of the decade. Most recently, Muren had helmed *Innerspace* and *Willow* at ILM, while Vargo made significant contributions to *Poltergeist II* and the original *Ghostbusters* at Boss Film, which made him a prized member of the sequel team. Harley Jessup, who had developed the look of *Innerspace*, signed on as art director.

"One thing that really helped us was the fact that we were allowed to start doing concept art for the film while Dan Aykroyd and Harold Ramis rewrote their script," Gorman says. "We'd ship our concept art down to them, then we'd suddenly get a revision of the script back, and our ideas would be worked into the script. A lot of our ideas became climactic moments in the film, like the Ghost Nanny stealing the baby. Their early drafts called for a giant bird-like Ray Harryhausen-type creature, but Jessup drew a malevolent Mary Poppins and Ivan fell in love with it, so Harold and Dan wrote it in. It was unusual to see that much feedback embraced by the production, and it made doing the impossible much more pleasant."

Another vital member of the creative team was matte painter Mark Sullivan, whose crew helped make Jessup's Ghost Nanny concept a cinematic reality. Sullivan's credits include *Return of the Jedi*, *Robocop*, *Rainman* and the cult classic, *Killer Klowns from Outer Space*. "There were three of us doing the matte paintings: myself, Caroleen Green and Yusei Uesugi," Sullivan recalls. "Yusei and I were so preoccupied on *Indy 3* that we didn't start any paintings for Ghost-

busters II until the end of March, which left us two and a half months to do what broke down to about a dozen shots, which is an extremely accelerated schedule! Fortunately, Dennis Muren was really good to work for—he had a really good eye for things that helped pump up our shots."

The Ghost Nanny sequence features Peter MacNichol in drag as a floating spectre who grabs Dana's baby off the ledge outside her towering apartment building. While some of the background paintings behind him were just photo retouches of shots of the New York City skyline, the shot looking straight down to the streets below Dana's apartment building was almost entirely a matte painting — only a small portion of the ledge of the building had been built at the Burbank Studios. "The challenge of that shot was to recreate the extreme perspective required in a painting, so I used a miniature of the apartment building as a guide to paint from.

"When there's a real wide angle shot like this one dealing with architecture, straight lines begin to curve towards the outer edges of the picture due to lens distortion, so to compensate for that, we shot our miniature with the same lens distortion, and projected that image onto the painting surface to determine the perspective. I only painted part of the street in there, leaving the middle of the road black so we could matte in a plate that had been shot of traffic moving down a little side street in New York. That painting was used for two shots: an establishing shot of Sigourney Weaver crawling after her baby—where she was rear-projected into the painting, and the following shot where the Ghost Nanny is matted in flying towards the ledge of the building."

Of all the sequences in the film, the one featuring the Scoleri Brothers floating in twin electric chairs above a crowded courtroom ended up looking the most like the storyboarded sequence Muren and Vargo had started with, but even that had been changed slightly from the original conception. "At first the Scolari Brothers were going to be tough dudes just walking around the room and picking things up and then they would become aerial," Gorman relates.

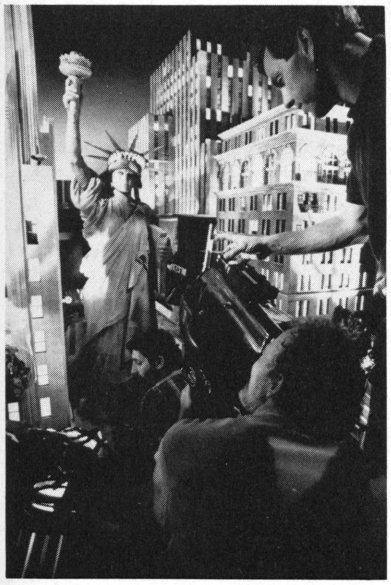
Opposite page: ***The unsavory Scoleri Brothers throw a tantrum in the courtroom (frame dupe).*** **Left:** ***Blue screen work for one of the Scoleris. From left to right are Dave Heron, I.J. Van Perre, and Tim Morgan reflecting light onto the subject, a real actor, for an electric glow. The cable trailing from the subject's foot runs wires to a computer, where a joystick controls the movements and expressions of the head.*** **Below:** ***Creature supervisor Tim Lawrence also played one of the Scoleri brothers. Bob Cooper (left), Victoria Lewis and Mike Smith help him suit up.***

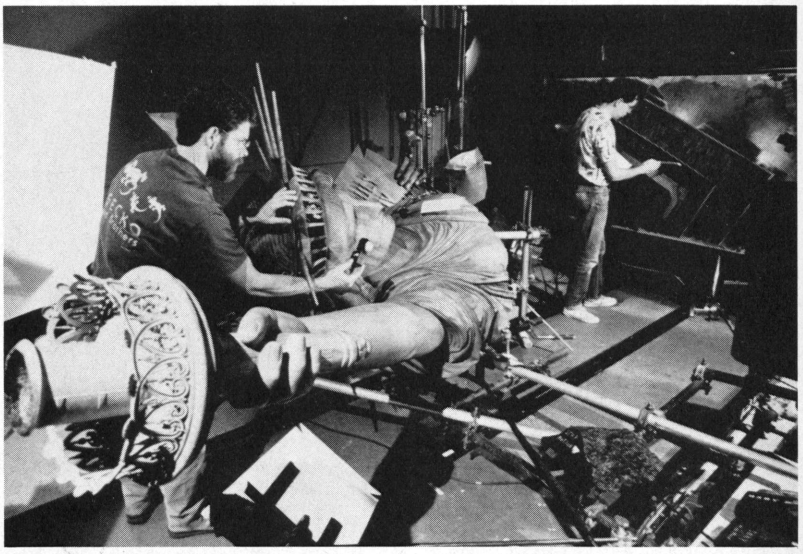
"Now they are seen floating in the air from the beginning, which was a matter of choreographic necessity when we were shooting the plates. Special credit should be given the animators on that sequence, who turned out more effects animation for the Scoleri Brothers scene alone than they do for most films."

One of the film's most memorable effects setpieces, in which the Ghostbusters confront a river of slime in the abandoned Van Horn station far below the streets of New York, was also one of the toughest. The finished shots were a seamless combination of full scale set, slime river element, miniature, and matte painting. "At TBS, they built the archway and a good portion of the roof of the tunnel that goes off into infinity," Healey explains. "The river was just blacked in on set and had paths for the actors to follow. The split line went right down the center of the arch for the painting."

Although Van Horn station was based on a real-life underground transit system begun back in the 1880s and never actually finished, the design of the station was made up for the film. The matte paintings Sullivan supervised were designed to make the set appear larger and deeper.

"There were three separate matte paintings in the Van Horn sequence to make that whole scene appear bigger," Sullivan recalls. "Those shots were proba-





Above: ***Frame dupe of the Statue of Liberty scene.***
Above right: ***Actor Jim Figh wanders the scale model streets of New York dressed as the Statue of Liberty. Cameraman Terry Chostner and assistant Randy Johnson get the fantastical shot.***
Right: ***Matte cameraman Wade Childress reads the light on Lady Liberty's face. In the background is matte painter Mark Sullivan. In the final composite of this combination matte and model shot, the camera dollies over the top of the statue and looks down on the Ghostbusters at the monument's base.***

bly about 75% painting. The stairway leading down to the edge of the river was there on the practical set, but the rest of the scene had to be painted in, including the far wall and the length and depth of the tunnel.

"Many of the shots of Van Horn Station were optical composites," Sullivan continues. "We'd do a painting on glass, scrape away the areas where we were going to incorporate the action, then back light the paintings so that one pass consisted of the painting by itself in front of a white field. Then we could pull a matte off the areas to be composited. High speed elements were shot separately on eight perf for the Slime River, for example, then combined with our paintings in optical. Compositing this stuff in optical is generally a time consuming way to work, but ironically it was necessitated by the hasty production schedule.

"The river on the final Van Horn miniature was about 10 inches wide," Gorman adds. "The crew puppeteering the slime named themselves 'River Rats' and they basically agitated and injected material into it. When we finally tested the mood slime in conjunction with that miniature set, it just didn't look the same—Ivan felt it didn't look dangerous, it didn't look alive and it didn't look like it was pulsing. At this point, the story metamorphosed and it became more important for the slime to get violent, so the notion came up of adding tentacles that would wrap around Dan Aykroyd's feet. We ended up roto-ing in the tentacles after doing some practical gags on set with Dan actually doing a lot of his own wire work."

Many of the ghostly entities plaguing the Ghostbusters were created by The Creature Shop in Van Nuys under the direction of effects makeup artist Rick Lazzarini, whose credits include *Batman*, *Aliens* and *A Nightmare on Elm Street V*. Since the apparition scenes demanded a wide range of expression from the ghosts to endow them with unnatural life, Lazzarini incorporated a telemetry device he calls "The Facial Waldo" into some of his creations. The device allows as many as 16 different head and facial movements to be operated by a single puppeteer by means of special sensors attached to his head, face and body.

"My most challenging effect was the 'theater ghost'—a winged, 6-eyed creature with four arms and a stinger," Lazzarini says. "There were so many appendages to operate that the Waldo was perfect. I wore the lightweight Waldo cap, so when I moved my head back and forth, the puppet would mimic my actions. If I opened my mouth, the ghost's would open also, and if I moved one eyebrow, all six brows on the ghost's face would imitate that movement! The Waldo freed my hands to control the wings, while other puppeteers operated the arms and stinger."

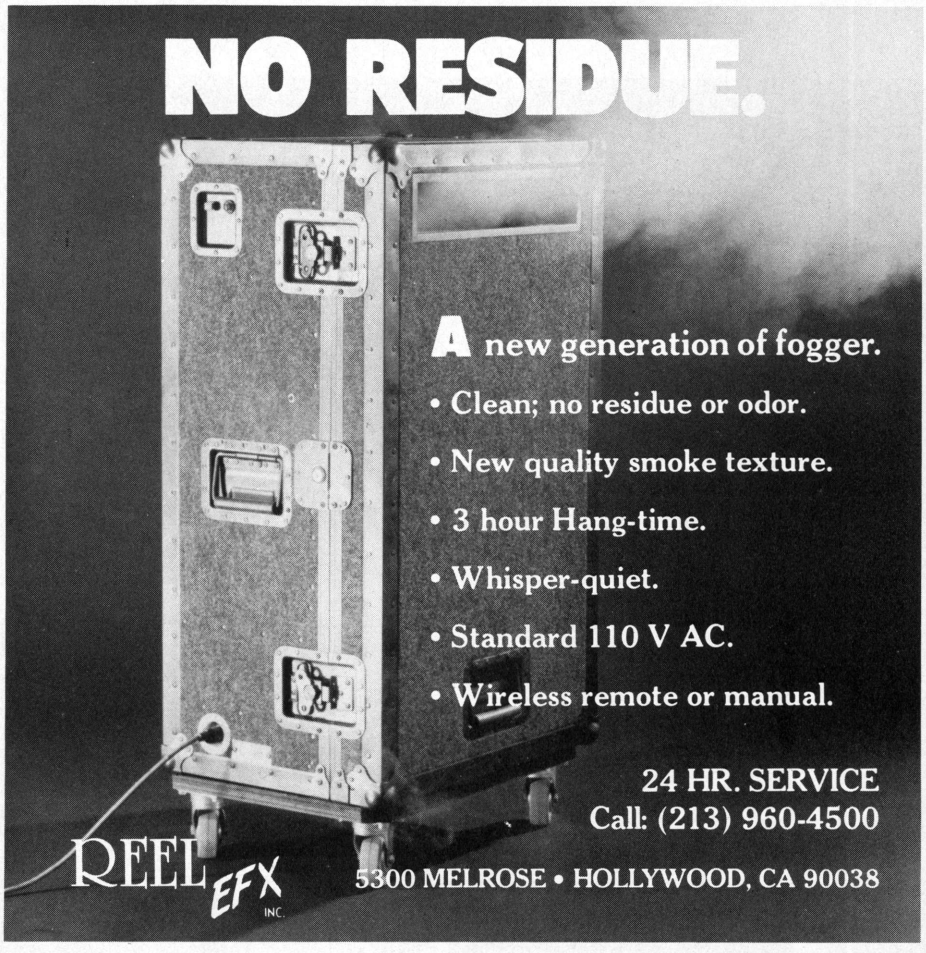
Like Van Horn Station, the art museum covered in slime was done as a combination of miniature, matte painting and live action effects. The effects footage was shot by Marty Rosenberg, who, along with art director Jessup and the ILM creature shop crew, came up with the idea of building a slime shell which would conform roughly to the shape of the New York Customs House they were using as the museum. The shell was built as a bas-relief, molded and vacuformed, then filled with water, diamond dust and articulate matter to match the look of the slime river. Four guys, each holding two lab syringes, injected the material strategically into the relief from behind.

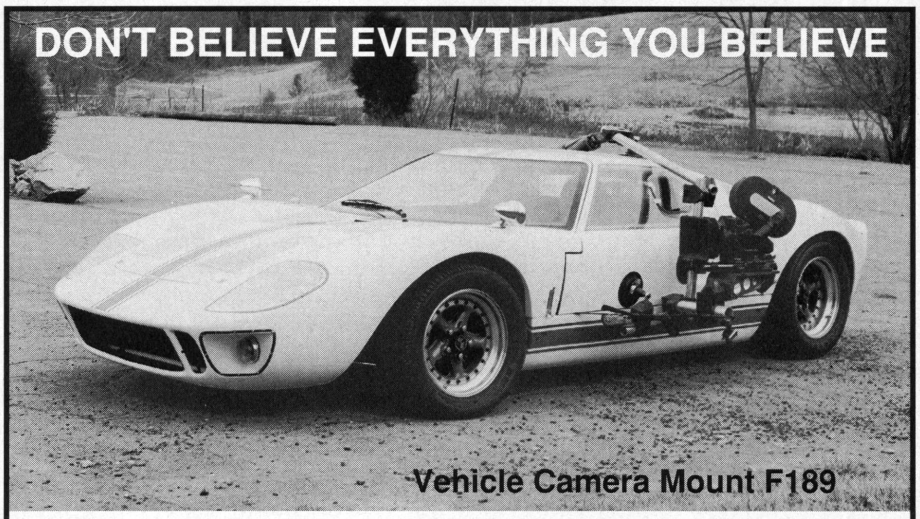
"Imagine taking an aquarium and contouring the front to look like the museum," Jessup explains. "We also built a dead-on matched miniature of the museum and burned that through in a couple of shots to give you the feeling you could see the museum back there.

"The matte painting people, who were responsible for creating the surround for the museum, really topped themselves. The master shots of the museum with the slime blowing off were all matte painting except for a latent image of the six foot museum miniature. The people in front were made from bottlecaps and peanuts and little costume jewelry gems which the model shop guys put on movers to create the effect of a swaying crowd below in the long shots. They even added cardboard taxicabs passing behind the building at one point!

"There were two or three other matte paintings in the museum sequence, most of which were done by Yusei Uesegi, and I felt those turned out better. For the most part, I'm pretty happy with what we were able to accomplish on a short time schedule."

Ironically, many of the matte paintings in the Statue of Liberty sequence were designed to convince the audience that the Ghostbusters were actually on Ellis Island, rather than to bring the statue to life. "The first shot was an aerial view, looking down over the head and shoulder of the statue at the four Ghostbusters standing at her feet, as the camera slowly booms down towards them on





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Above and right: ***In the "ghost nanny" sequence, the long arm of actor Peter McNichol steals Sigourney Weaver's baby, with a little help from ILM.***

what seems to be the world's biggest Chapman crane," Sullivan explains. "Since objects that are closer to camera move more quickly than things in the background, we couldn't paint the Statue of Liberty into the scene—we had a model built instead. We rear projected a small image of the Ghostbusters—which was shot in Burbank on top of a 20' section representing the pavement around the statue—into a 4' x 8' painting depicting the abutments around the base of the Statue of Liberty. In front of that we placed our 4' model of the Statue's head and torch, and we shot the entire scene on the automat camera, which we programmed to move so that the camera pushed in very little toward the painting while the statue's head appears to be moving a lot. Since we also had to move the statue laterally to create the effect, all the lights around her had to be on a gimbal that would move with her. This ended up being one of the last shots we did, and we finished it in a really last ditch attempt."

Due to the urgency of the pace at this point, Sullivan attempted something he had never tried before: working on the painting for the over the shoulder shot of the Statue of Liberty with another painter: "It really helped to speed the process up," he remarks, almost surprised. "It was an interesting experiment for me, although I know it's been done here before. I worked on the right side of the painting and Caroleen Green worked on the left. She helped draw a lot of it in, and blocked in a lot of the colors. It worked out well because our painting styles are pretty similar.

"We had the model shop build us a miniature of the base of the statue as a guide, and we even went so far as to put miniature lights on it before we shot it, so it could be lit as if the crew was out there lighting that set. We projected those photos onto the masonite panel we were painting on and used that as a guide to paint from, so we weren't making things up as we went along."

The next shot in the sequence was a reverse angle looking over the shoulders of the Ghostbusters towards the Statue of Liberty. "That shot was a blue screen composite that used a matte painting by Caroleen Green to represent the Statue of Liberty in the background," Sullivan says. "The Ghostbusters were blue screen matted over the painting in optical."

Finding the best way to bring the Statue of Liberty to life was Dennis Muren's next objective. Like the Marshmallowman in the original *Ghostbusters*, Muren felt that a man in a suit was the best way to go as far as repeatibility and budgetary limitations were concerned. The only other way to handle the effect was to use Go-motion, which would have required a finely articulated puppet and taken much more time than ILM had. "The Statue was a suit created in the creature shop under Tim Lawrence's supervision," Gorman explains. "At first we thought we'd have a small person do it and keep the scale down, but that didn't really work, so we scaled everything up to the size of a normal person, a local actor named Jim Fye, who's a tall, skinny fellow about 6'3"."

Muren toyed with the idea of letting the man in the Statue of Liberty suit wander through a miniature cityscape ala Godzilla, then rejected it for budgetary considerations. "There were 13 shots in that sequence," Gorman relates, "and every one of those shots used background plates except one in which the statue is heading right at us and looking around. That was shot high speed with foreground miniature buildings. We re-used a couple of them we'd made for other films, and built most of the high rises seen in the foreground."

Editing the Statue of Liberty sequence proved to be a prob-

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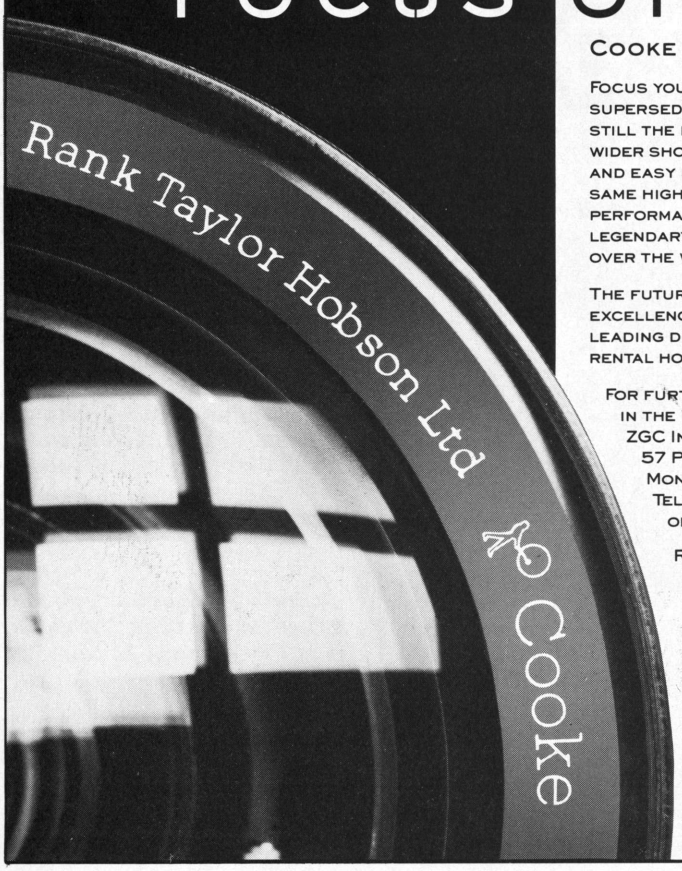

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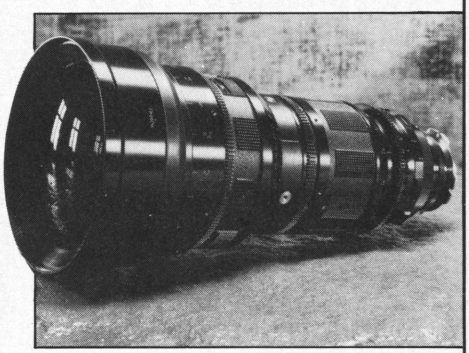

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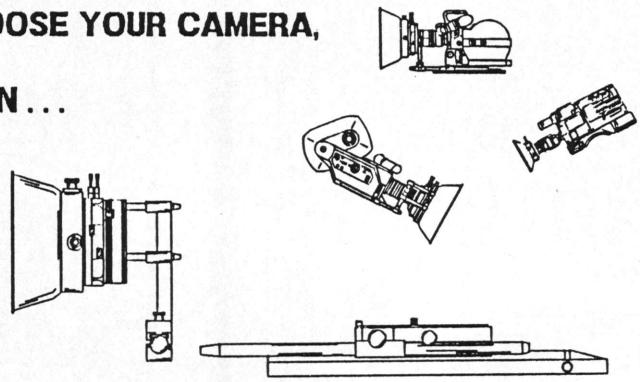

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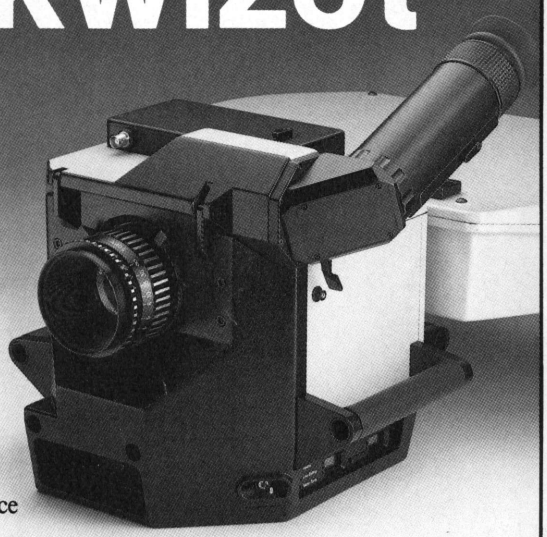

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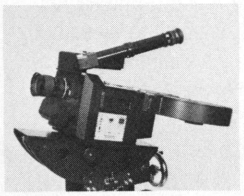
lem until the statue's pace could be made repeatable. "We ended up having Jim Fye walk to a metronome beat to establish the pace," Gorman says. "The first AD would clap at the beginning of each shot and give him his cue. That way we were able to get that consistent, lumbering Talos-like pace we wanted."

Although the plan was simply to film the Statue of Liberty suit on-stage and then matte it into background plates shot in New York at Christmas, some of those background plates turned out to be rather difficult to use. "When we got our plates back, we saw people throwing confetti, waving balloons and tossing their hats into the air right where the statue was supposed to go," Gorman says, his eyes widening. "We realized we just had to roto that stuff out competely, so when you see her foot revealed coming around the corner, that plate involved a masterful job of articulation by the roto-department to make the crowd fit into the shot."

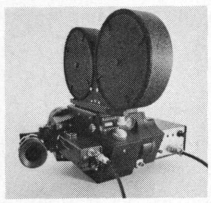
The final matte paintings in the Statue of Liberty sequence were used to enhance the background plates in the scenes where she appears to be walking down 5th Avenue. "The background plates had some really nice lighted areas at the base of the buildings, but the whole upper part of the buildings immediately fell to black, so we painted them back in. These shots of 5th Avenue were full-fledged matte paintings as opposed to what we did in the Ghost Nanny sequence—here we took the opportunity to redesign the skyline by adding more buildings per square inch than were there, just to make it a little prettier, a little more interesting to look at."

Ghostbusters was done on the fastest schedule ever contrived, even for this team of consummate experts. The consensus was: "It's really the tightest schedule we've ever had, and it is amazing how well everyone worked together on the project!" ▲

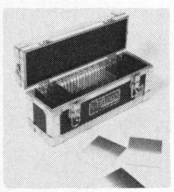
The author is a Los Angeles free lance writer who has just completed a new play, Once Upon a Midnight.



Vistavision reflex with motor & video assist



Vidiflex 2 video assist & 120M2 motor for Mitchell S35R/Mark II



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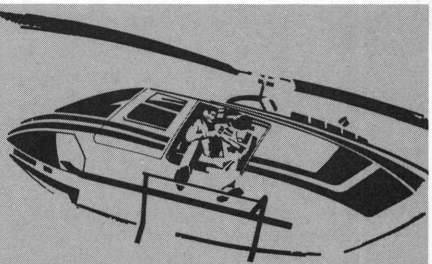

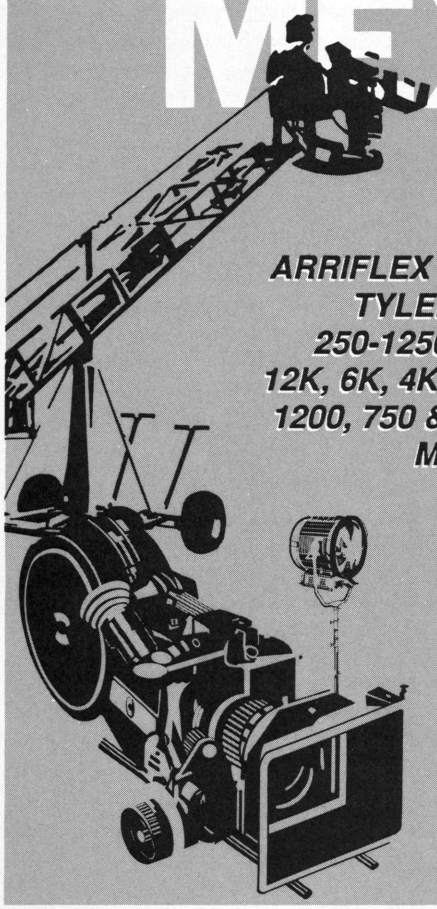

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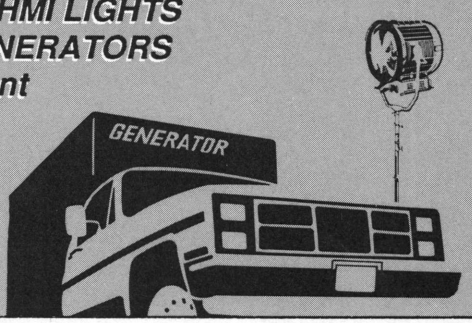

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Poppin' Fresh and Green Giant Are Born

by Nora Lee

Can you sing along ?

Nothin' says lovin'
Like somethin' from the oven!
And Pillsbury says it best!

You can't sing it without thinking of Poppin' Fresh, the little dough boy who always got his tummy poked. How about this one?

Good things from the valley...
Valley of the Jolly
Ho! Ho! Ho!
Green Giant!

Those mighty green legs immediately come to mind, don't they? A whole generation of people grew up on those marvelous commercials. Many in the world of special effects cut their baby teeth on them and the man behind the camera was Joe Rayner. His vast commercial credit sheet begins back in the days of Cascade Productions, one of the first companies on the West Coast to make commercials for television. "Barney Carr, Roy Seawright and Vaughn Paul headed up the company," recalled Rayner. "It was all people who came from Hal Roach Studios. First they broke away to do industrials and government training films. Then they brought their filmmaking expertise to commercials. At the time, commercials were the low end of Hollywood . . ." Little did they know.

Rayner actually started his career in commercials and filmmaking in England. When he took a job with the Eastman Kodak Co., part of the deal was a stint in school to learn photography. Rayner took advantage of the system and went to school for five years. He came to America and decided to stay.

Of course, once he made his way to Hollywood, it became clear he couldn't easily get a job in motion picture photography. "Hollywood was very unionized and someone like me couldn't get anywhere near a camera, so I went to work as a machinist. I had apprenticed as a machinist before I went into the service in England. Oddly enough, the man I went to work for was in the motion picture business doing titles. His name was Louis Meyer.

"I worked with him for two years building an optical printer and a photo-lettering system. This was before photo-lettering was available in any other form and Meyer leased the machine to the Howard Anderson Company. I went to Anderson's to install and run the system. Besides doing titles, I got into doing other things like insert shots for movies—I was there seven years," said Rayner.

By the time Rayner had completed his "learning experience" at Anderson's he had also met Phil Kellison. Their association was to cover three decades, hundreds of projects and many reincarnations of the Cascade crew. "I did a movie with Phil and when he left to go to Cascade, I followed," recalled Rayner. "We started what was the first in-house effects department for commercials. They already had their own optical department, but we did physical effects—stop-motion, puppets, explosions—everything."

Moving to Cascade was not a simple adjustment for Rayner. He explained, "I left a feature and TV production house, which Anderson's was, and went to Cascade where the thrust was on commercials. It's a major step to work where people could spend hours on the look of a box. In a feature, we'd throw it up in front of the camera, say 'Yeah, it kinda matches.' We'd light it and shoot and be on to the next thing! Commercial companies are very different. The painstaking nitpicking that goes on for each set-up is deadly serious and it takes a while to catch on. People who don't make commercials don't realize how much time and effort goes into them—proportionally far more than any feature! The ratio of time spent to time on screen is incredible!"

During the late '60s Cascade was more than just a commercial house. The list of people who worked there

reads like a Who's Who of Special Effects. Rayner agreed that Cascade was one of the few places a young person interested in effects could get some hands-on experience. At any one time you might find Dennis Muren, Ken Ralston, Greg Jein, Jon Berg, Phil Tippett, Jim Danforth, Tom Scherman or others building models, puppeteering or learning the fine art of stop-motion animation.

Eventually Cascade went under and four of the crew got together at Sander Tape and Film, which then turned into Coast Productions. Coast continued and expanded the list of memorable commercials that Kellison and Rayner had begun and added a few low-budget films. In January 1988, the principals at Coast decided to sell the company. Kellison retired; Nancy and Charles Evelyn and Rayner bought the effects portion of the company and became Trio EFX.

The walls at Trio are lined with photos that encapsulate the amazing variety of commercials of which Rayner has been a part. Of course, the Green Giant spots started it all. "We built the whole valley for the Green Giant in miniature and we had the Green Giant stand in it. That sequence was used as a tag for all the products for many years. At that time, we had miniature backgrounds for the canned foods and animated backgrounds for frozen foods. Then for one year the agency wanted to use real people with the Green Giant. We did what we called magnascope shots (no relation to the 65mm system or to the screen-widening system Magniscope). We had various people from the village, like the mayor, talking with the Green Giant in the background. What we were doing was, in essence, a hanging miniature—a forced perspective process that allowed us to make the actor appear to be a giant."

In an interesting aside, Rayner mentioned that a company called Swift/Chapman originally shot the Green Giant spots, and long before there was much color television they chose to film the commercials in color. As a result, the footage could be used for many years.

Poppin' Fresh followed Green Giant, and it was Rayner himself who machined the original armature for the little guy. He's come and gone over the years, but he is undoubtedly one of the most identifiable corporate symbols around. Other companies are doing the newest Poppin' Fresh commercials and understandably, Rayner is a bit paternalistic when it comes to the dough boy. "Those of us who know the dough boy or who have been around him since he was conceived can more readily see the character changes in the new spots. They are minute, but they change him subtly. When we do it, we use the same molds and the same heads that we did for the original spot.

"We had the account for years and years and years. I think the company wanted a new look and that's fine. You can't keep them forever," said Rayner philosophically.

He has no idea how many dough boy commercials he's done over the years, but one particular Crescent Roll job stands out. "This commercial was a really pleasing one for me because I thought we got a neat look to the background. We worked with art director Terry Baker. The background was a somewhat stylized kitchen that didn't really say 'kitchen.' It was a radical departure at the time that got away from the ordinary Midwestern kitchen we had used. We did it in blue and we had strong shadows. The lighting was much bolder than what we had done before and I was very pleased with it."

One of the reasons Rayner has stuck with commercials is that he enjoys the challenge. Someone walks in the door every day with a new kind of prob-

Opposite page, left and below: ***Rayner's newest go-motion animation work features a dancing food blender and a mini-processor, Astaire and Rogers style.***

Top to bottom: ***Poppin' Fresh, first animated by Rayner in the early 70s; Green Giant overlooks his valley; Vanish 'Flushtones' represent the latest in stop motion techniques.***

lem that has to be solved. In a spot for the Massachusetts Lottery, for example, a man is talking while money is raining down around him. It looks like it fills the room. "Well," explained Rayner, "it's physically impossible to get that much money down fast enough to fill a room in thirty seconds! When you look at our commercial up close, you don't think there is any trick happening, but to get it to work, we undercranked. The money is falling faster than the man is talking. We shot at half-speed while the actor talked at half-speed. We then projected it at normal speed so that we could get twice as much money coming down. And it doesn't look like a trick.

"We also had half-scale money in the foreground falling into a tank. It was coming down at the same speed, but it was confined to the tank so the space between the actor and the camera filled up faster. It actually worked like a wipe. People look at it and say, 'Well how hard can it be?' But try getting an actor to act at twelve frames!" Rayner was the director/cameraman on this shoot. It's a role he took on five or six years ago.

"Phil [Kellison] liked to do more of the camera end, so I took over more of the directing chores. We were a good team. Then when Phil retired, I continued to direct. With the expansion of effects techniques, we can use more people in what we do." Rayner believes that an effects/live-action director has the edge over his live-action counterpart. "Not only are you responsible for the people, but you have to make sure the trick works. You can do a lot more."

One of Cascade-Coast-Trio's trademarks has always been stop-motion animation. A commercial Rayner and longtime associate Peter Kleinow did for Kraft Velveeta required them to make jalapeno peppers dance. "Peter and I have worked together for years and Peter is a superb stop-motion animator. Without denigrating any of the others—and I know most of them—Peter is the best there is. He's practically the greybeard of stop-motion. He goes back to Gumby days. He managed to get a lot of character into these inanimate little peppers.

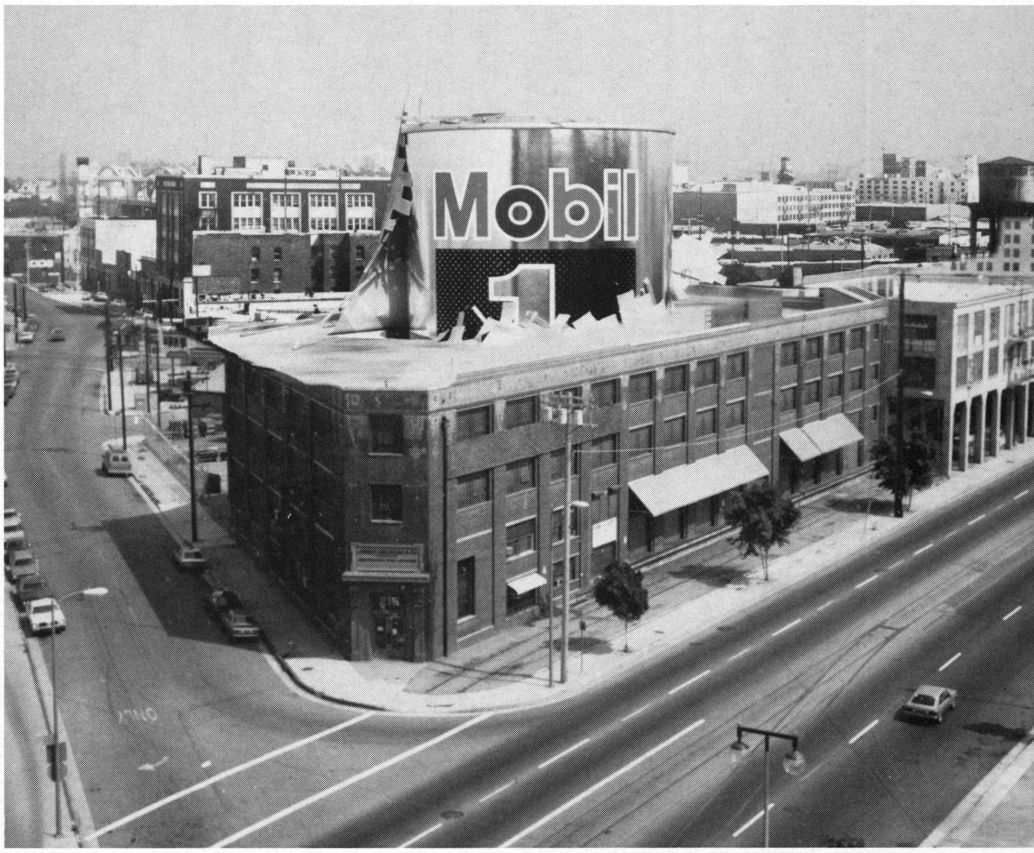
"In this spot in particular, we had a live-action hand and a plate of chips in the foreground, the animated peppers in the middle and then we

opened the top of the cheese box and we blew out hats and streamers and confetti at five times normal. So we had high speed, stop motion and live-action all in one scene. And it all had to match."

One reason matching wasn't a major problem is that, like almost everyone else today, Trio composites in video. Rayner sees video compositing as one of two technical advances that have revolutionized effects in commercials and for television. "We can do much more critical optical work than we could do in film just because we can see it. We can make much better color matches and split screens that are virtually impossible in film. Even without time and budget constraints, there are so many variables in film! Plus, you are two or three generations down when you have to go through opticals. Now we are working from original negative and that's what will be seen," Rayner said.

Of course, the other technical advancement Rayner speaks of is motion control. "Whenever we used to do a trick that involved two pieces of film, or if we wanted to add something to our original piece of film, we had to have a locked-off camera to get it to match. We just couldn't do it any other way—if we tried to, we couldn't do it that accurately. There always seemed to be pieces moving against each other. Now, with motion control, the computer makes very elaborate moves and can repeat them over and over again exactly. Motion control has freed up the camera. In the past, tricks were announced by the locked-off camera. Now, the shots are much more dynamic," Rayner insisted.

Still, there are times when the right approach is simple and maybe a bit old-fashioned. "The spot for Mobil One oil, like Green Giant, was done in the camera. The Mobil clients were always very leery of the line, 'Trust me, it's going to work.' We knew that we could put a miniature oil can on top of a building and that it was going to fit perfectly, but for some reason . . . So, this one was done so the clients could look through the camera. We used a variation of the Schufftan technique. Phil designed it. We used a single-surfaced silver mirror and set up the shot so that when you look through the lens into the mirror, the miniature appears right on top of the building. Once the mirror is set up, you scrape away the silver so that you can see, in this case, the building. Now the miniature is actually off to the side.



Above: ***In camera effect (a Schufftan shot) for this 80s Mobil ad. Below: Director/ cameraman Rayner appears to be buried in money.***

"Everything on the miniature was done in reverse—the lettering is backwards—and the support for the miniature is hidden, because the glass is clear in that area. It took a little time to set up, but it all happened in the camera. I took the razor blade to begin scraping—that's the nervous part—and I kept thinking, 'Oh God, what if I miss?' I guess that's why we get the big bucks—we know where to scrape. The clients were happy. In fact they were even in the shot. They came out of the door of the building and walked down the sidewalk. Others drove their car through the shot. And they could see everything in playback just

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as it would look in the commercial. I quite honestly don't know if we would do the spot the same way today. It might not be economical to do it like that now," admitted Rayner.

From the sublime to the ridiculous, one can never tell what ideas an ad agency will come up with. Besides the ones mentioned, Rayner has made Mrs. Butterworth wink, brought life to Speedy Alka Seltzer, blown up bags of Lay's potato chips, taught toilet bowls how to sing "I've Got You Under My Rim," and most recently he and his crew had an Oster blender and mini-food processor give a dance recital.

The Oster commercial is a good example of how all Rayner's skills and experience come together. There's music, choreography, stop-motion animation, and live-action all in one commercial. As Rayner told it, "It was a lot of hard work. It took a lot of people and everything was planned to the nth degree. We even videotaped dancers to use as a guide for the stop-motion animation." The idea is that the mini-processor will work on the same base as the Oster Blender—perfect kitchen partners. To prove it, they do an Astaire/Rogers routine on the countertop.

"An awful lot of this was shot with a wide-angle lens, which gave us a more expansive feel to the kitchen," Rayner continued. "You want to play the blender and the new product up full-screen and tight, so if you can shoot with a wide-angle lens you can see much more of the background at the same time. We even had trees outside—the whole nine yards!

"The blender and the mini-food processor were all shot motion control. They were hung on rigs we designed and moved by computer. We had the videotape that we had done with the choreographer, but when we got down to actually making the machines dance, we found we had to modify things. Maybe because it would make a better shot if we did it a little quicker or a little slower. Maybe it just looked better.

"We described a basic circle—from the blender base around the counter top and back. Then we sat here and thrashed out what the pair could do. We had time considerations, so they could only do so much. There was the live demo at the beginning and a three-sec-

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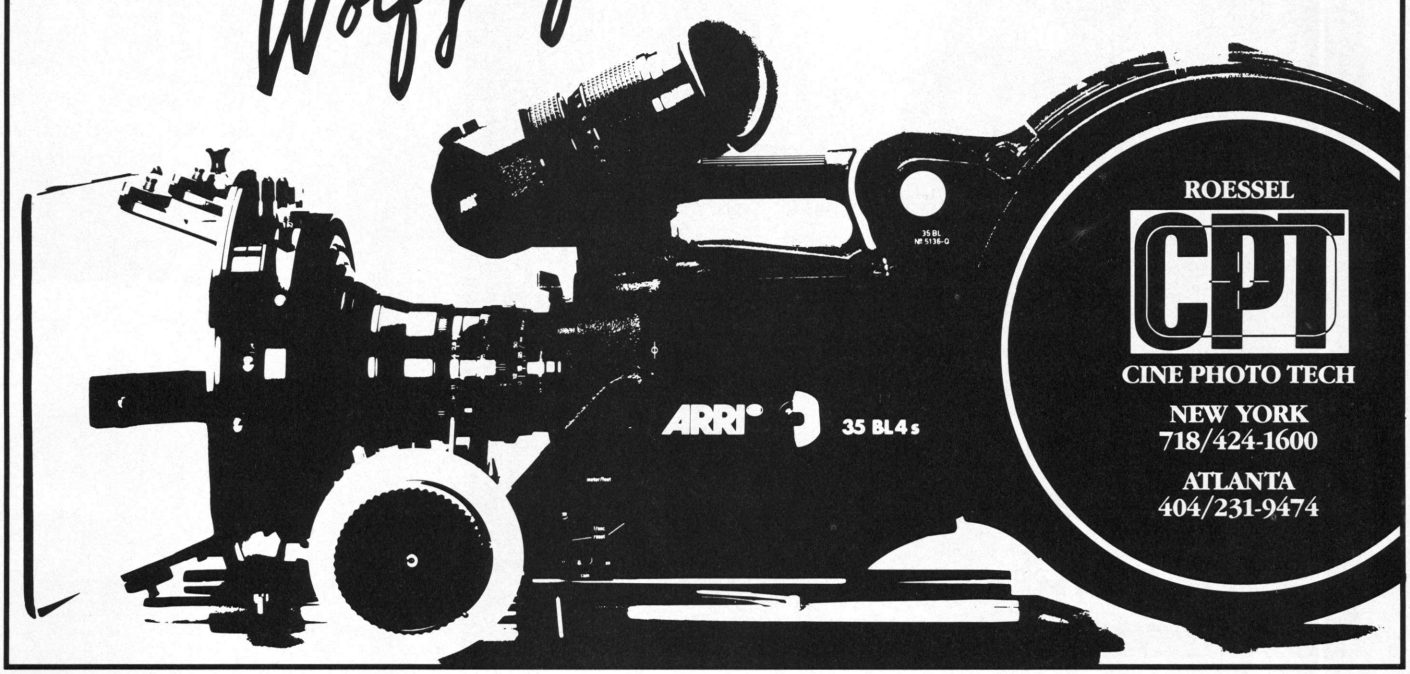

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ond tag at the end that left only about 19 seconds of dance.

"It was all shot on the set. We used go-motion to help 'disappear' the wires, and electronic split-screens for the rest. We did a double pass of the background to use in the split screen, but what you see is basically what we shot. Each exposure was six seconds and the objects moved while we were shooting to eliminate the stop-motion shudder."

From Poppin' Fresh dough boys to dancing blenders, Rayner **admitted modestly, "A lot of what we do is done in pre-preparation. It's done in** the shop. Often the photography is the simplest part."

Rayner sees commercials as a much more collaborative medium than features. "There are very, very few auteurs," he explained. "Most of us work with creatives who have a strong idea of what they want on the screen. I have to consider everybody's point of view. A lot of what I do is diplomacy.

"But I like what I'm doing. I would do it again and I don't even know if I would make any changes. I'm always looking forward to the next project. A lot of things are out of my control, but of the things I can control, I don't think I would change much." ▲

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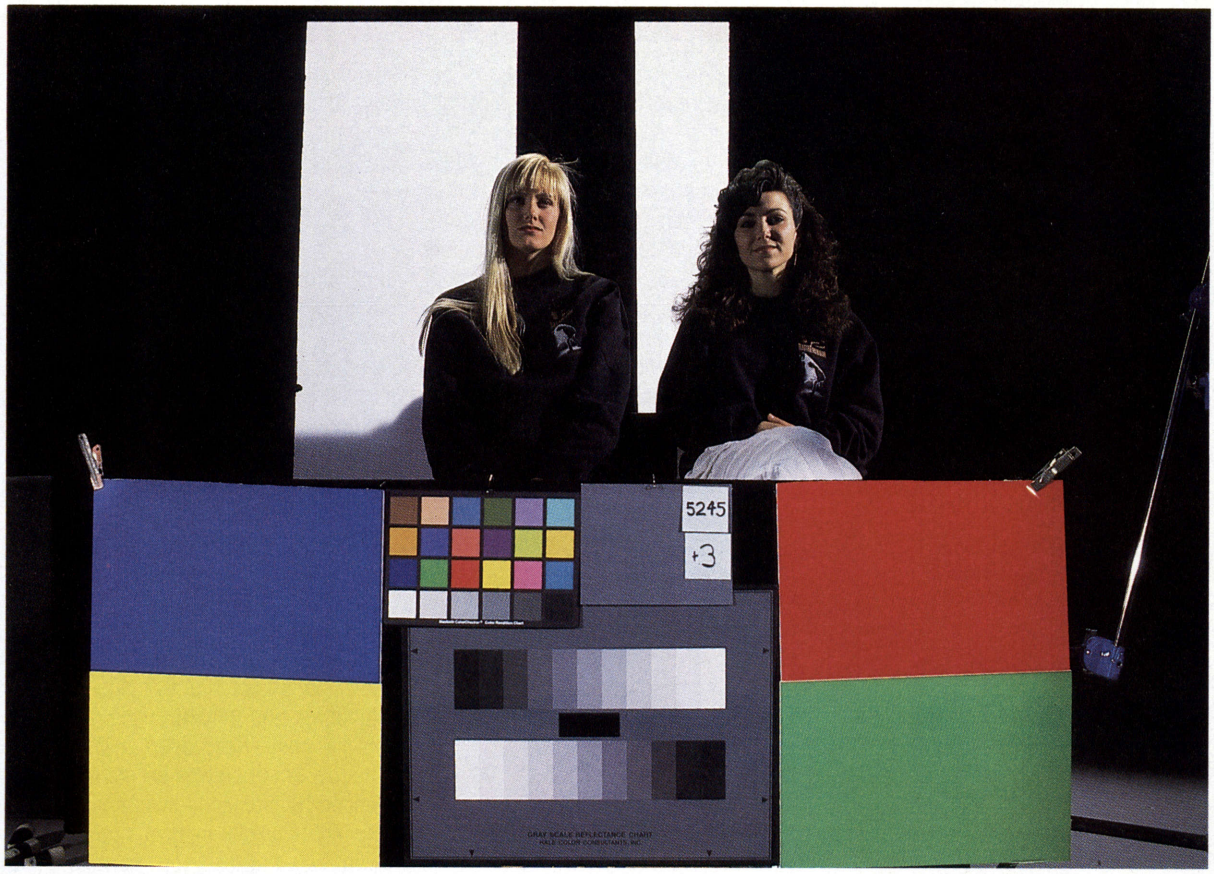


Film Stock Tests: Fuji
(Second in Series)

by Karl Herrmann

Editor's Note: In the November issue, procedures were discussed for testing 35 millimeter camera negative films and findings were published on Afga Films XT125 and XT320. In this issue Fuji films are the subject. Testing procedures remain identical, since all films were tested together.

FUJI 8510 (L.A.D. .79 1.22 1.76) Hazeltine 34-33-27
Testing ASA/ISO was 64. Rated ASA/ISO 64.
Treatment of choice was overexposure of one stop/normal processing, although several other treatments were close contenders.

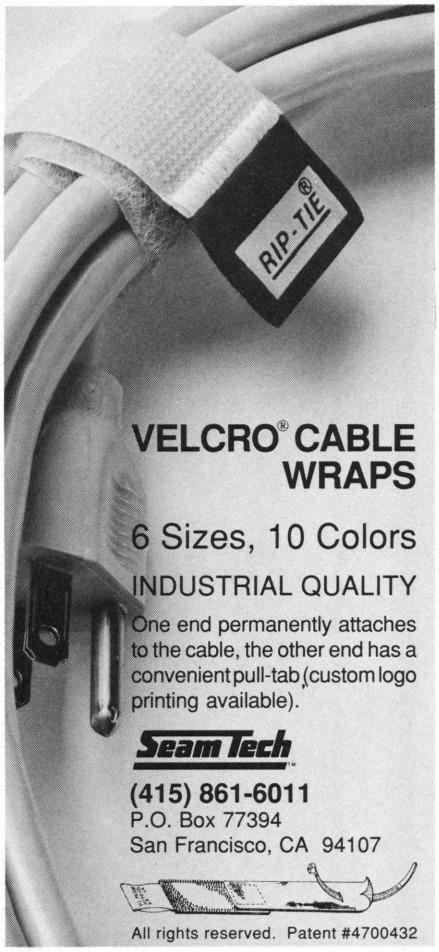
Normal exposure and normal processing produced a good looking print. Color saturation was neutral with clean and snappy highlights. Flesh tones in the highlights took on a powder like texture, while the shadows exhibited a golden tone. Unfortunately, this shadow tonality didn't have a healthy look. Blacks were dark and warm, favoring red, but didn't achieve a deep velvet feel. Sweatshirt detail was excellent indicating good shadow detail. Grain was tight and sharp. Printing lights were 33-31-31.

In a one stop underexposure with normal processing situation this stock changed dramatically. There was a decided shift towards blue. Increased contrast was apparent, especially in the 4:1 lighting of flesh tones. Grain was similar to normal, however blacks were less dense and had a yellow shift. Printing lights were 27-24-23. An additional stop of underexposure increased the above situation and added a magenta/blue veiling in the highlights.

The treatment of choice, overexposure of one stop with normal processing, had a slightly cool cyan tone. Contrast remained similar to normal, while colors became slightly more pastel. Blacks were dark and neutral, yet lacked a deep velvet feel. Grain was soft, tight and fine, and produced excellent resolution. Printing lights were 37-35-35.

An overexposure of two stops with normal processing also produced a good print. The overall look was equal to our hero choice, however highlights were losing detail in the upper zone of the scale. Color remained pastel. Contrast decreased, producing more detail in the black sweatshirts. Skin tones were slightly cyan, but not objectionable. Printing lights were 43-42-43.

The classic one stop underex-



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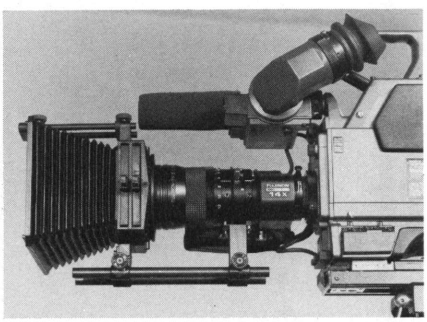

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posure with a push process produced colors with good saturation, but without the snap of normal. Contrast, as expected, increased in both the highlight and shadow areas. Shadow areas lost detail with this treatment and black density was diminished with a yellow tonality. Grain size and structure remained similar to normal. Printing lights were 31-28-28. An additional stop of underexposure gave the film more contrast, a dirty look in the flesh tones, and a decided magenta/blue cast.

One stop overexposure coupled to a pull process produced an image similar in many areas to normal. A pastel color chart and skin tones without snap were the major differences. Suprisingly, black density and shadow detail were only slightly increased over normal and the grain was identical. The overall look was similar to a one stop overexposure with normal processing, but without the crispness. Printing lights were 32-32-30.

FUJI 8520 Daylight (L.A.D. .84 1.24 1.85) Hazeltine 34-32-28
Testing ASA/ISO 80 Rated ASA/ISO 64
Treatment of choice was normal exposure/normal processing.

Normal exposure and normal processing produced good color saturation with a subtle green shift. Blacks were deep and favored the warm, red spectrum, while flesh tones had a very slight green color. This sharp, fine grained film had excellent resolution. It actually tested one third stop faster than its rated ASA/ISO. Overall, this stock had good contrast, saturation and fine grain. Printing lights were 34-32-28.

A one stop underexposure and normal processing produced highlight detail, color, and grain similar to normal. Blacks were deep and favored red. A sharp contrast increase exhibited little detail in the sweatshirts. Flesh tones also showed the contrast increase, along with a slight orange cast in the shadows. Printing lights were 27-26-28. An additional stop of underexposure produced a definite magenta cast and more contrast. This treatment appeared gritty looking and had a documentary feel to it.

Two stops overexposure and normal processing worked well on this stock. Color was more pastel than normal with neutral highlights. Flesh tones were similar to normal and shadows had a slight golden cast. Blacks were black and sweatshirt detail was slightly better than normal. Although the highlights lost detail in the upper zone, this was a nice look of pastel color and black blacks. Printing lights were 43-43-47.

One stop underexposure with push processing produced a contrasty and heavy looking print of warm overall tonality. The chart was saturated and the warm tones removed the snap from the highlights. Flesh tones were slightly magenta in the highlights with a contrasty orange shift in the shadows. Blacks had a red tone and lacked the density of normal. Printing lights were 27-28-32. Further underexposure affected sharpness and produced a muddy look.

With two stops overexposure and pull processing, this stock had many pleasing elements. Colors were pastel. Flesh tones were slightly magenta in the highlights and golden in the shadows. Blacks were rich, deep and neutral. Shadow rendition was excellent, as evidenced by increased sweatshirt detail. Highlights were neutral and snappy. Grain was fine and soft. Printing lights were 36-37-40. Printing down slightly with lights of 39-40-43, this treatment would look very good.

FUJI 8530 (L.A.D. .76 1.23.1.68) Hazeltine 34-32-28
Testing ASA/ISO 160 Rated ASA/ISO 125
Treatment of choice was two stops overexposure/normal processing.

Normal exposure with normal processing produced a contrasty print which favored cyan. Both highlights and shadows lost detail on extreme ends. Flesh tones were cool in the highlights and favored yellow in the shadows. Images were sharp and crisp despite a black that was only moderately black. Printing lights were 31-29-24.

One stop underexposure with normal processing produced a very contrasty print. The color chart was more saturated and the bottom two zones on the gray scale lost detail. Highlights had a slight magenta/yellow cast . Flesh tones were neutral in the highlights, but exhibited a gritty look in the 4:1 lighting ratio. Printing lights were 25-24-19.

One stop overexposure with

normal processing produced a very nice rendition of the test scene. Colors were saturated and neutral. Pleasing flesh tones in both highlights and shadows were recorded along with a clean, dark black. The basic contrasty nature of this stock bodes a warning against underexposure. Printing lights were 37-36-32.

The treatment of choice, two stops overexposure with normal processing, produced quite a delicate print. Flesh tones took on a golden quality overall that was very pleasing. Blacks were dark, crisp and neutral while highlights remained normal. Shadow detail was excellent. Grain was both fine and soft. Printing lights were 43-42-40.

A one stop underexposure with push processing increased the contrast of an already contrasty stock, which produced a warm, heavy feeling print. Blacks were not black and shadow detail was gone. Flesh tones exhibited a slight orange cast along with increased contrast. Color saturation was rich, but favored yellow/orange. Printing lights were 30-29-25.

With a one stop overexposure and pull processing, this film produced a print with less contrast and more pastel colors. Highlight reproduction was better than normal. Blacks were full, having excellent tonal reproduction along with a rich, neutral density. Grain was both soft and fine. Printing lights were 30-30-24. An additional stop of overexposure flattened contrast further and produced pleasing flesh tones. Overall tonality, however, was cool.

FUJI 8550 (L.A.D. .79 1.08 1.66) Hazeltine 36-30-26
Testing ASA/ISO 250 Rated ASA/ISO 250
Treatment of choice was one stop overexposure/normal processing.

Normal exposure with normal processing produced a print with good contrast and subtle rendition of flesh tones. The gray scale exhibited good seperation throughout, especially in the blacks, indicating good shadow detail. Highlights narrowly held detail. Blacks, though rich, lacked depth and had a slight red tone. Printing lights in this medium grain film were 34-26-26.

A one stop underexposure with normal processing revealed a rapid contrast increase in flesh tones. The 3:1

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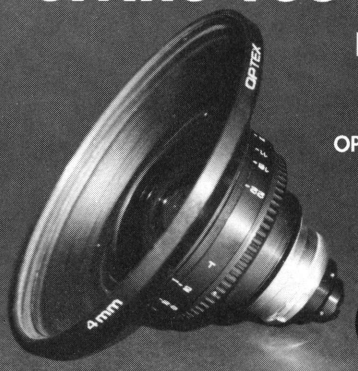

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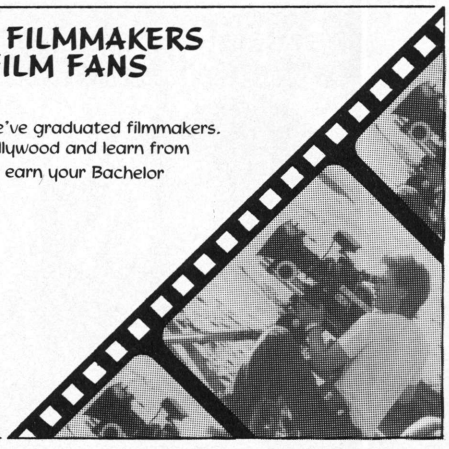

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lighting ratio looked more like 5:1 or 6:1. Highlights lacked snap and blacks were similar to normal. Grain size increased and had a granular feel. Printing lights were 30-22-21.

The treatment of choice, one stop overexposure with normal processing, produced a print with saturated colors favoring the warm side of neutral. Flesh tones overall were recorded with pleasing subtlety. Blacks were black and dark zones were an excellent rendition of reality. Highlights showed detail similar to normal. Printing lights were 41-34-35. An additional stop of overexposure produced highlights lacking detail and shadows with excellent detail.

One stop underexposure with pull processing increased both contrast and grain. Color was saturated and warm. Highlights remained as normal, however black density diminished with a warm tonality. Flesh tones were yellow/green in the highlights and green in the shadows. Sweatshirt detail was less than normal. This treatment had the feel of a Kodachrome slide. Printing lights were 32-26-27. An additional stop of underexposure produced strong red shifts and more contrast overall.

One stop overexposure and pull processing diminished contrast and color saturation. Flesh tones were enhanced in both highlights and shadows. Sweatshirt detail was excellent and blacks were dark and neutral. Highlights had a hint of magenta overall, but held detail. Grain was tight and softer in appearance than normal. This treatment produced a soft quality in color and shadow rendition while maintaining rich blacks. Printing lights were 33-24-24.

FUJI 8514 (L.A.D..78 1.19 1.66) Hazeltine 36-33-26
Testing ASA/ISO 500 Rated ASA/ISO 500
Treatment of choice was normal exposure/normal processing.

Normal exposure with normal processing, the treatment of choice, produced a contrasty image which was low in color saturation. Flesh tones were warm with a golden appearance in the shadow areas. Both highlights and shadows held detail. Blacks were dark and warm, favoring red. This high speed stock had prominent grain, which produced a gritty feel. Printing lights were 36-33-26.

An underexposure of one stop with normal processing revealed a chart with more color saturation. A magenta shift along with increased contrast was evident in all flesh tones. Highlights held detail, but along with blacks, favored magenta. Grain was more pronounced. Printing lights were 28-25-21. An additional stop of underexposure produced a strong magenta veil overall, prominent grain, and little shadow detail.

With a one stop overexposure and normal processing, the results were similar to normal, but with warmer, less snappy color overall. This treatment took the harsh edge off the stock, darkened the blacks and retained highlight details. Flesh tones were pleasing, exhibiting an enhanced golden tonality in the shadows. Grain was tighter than normal, but similiar in size. Printing lights were 38-36-34. An additional stop of overexposure produced pastel colors, excellent shadow detail, and highlights that lost detail in the upper two zones of the scale.

The classic underexposure one stop with a push process offered a print which, suprisingly, had less color saturation than normal. Contrast increased both in blacks and flesh tones. Highlights lost detail in the upper zone on the scale and had a magenta/yellow shift. Sweatshirt detail was diminished, indicating a lack of shadow detail. Fleshtones had a yellow shift and appeared dirty. Grain was decidedly larger. Printing lights were 32-30-27.

Overexposure one stop with a pull process produced a print with pastel colors and less contrast. This treatment was a contender for treatment of choice. Flesh tones had a slight magenta tone in the highlights and golden quality in the shadows, with a soft quality overall. Sweatshirt detail was excellent and blacks were dark. Highlight detail was similar to normal and grain appeared, tight and softer than normal. Printing lights were 32-29-26. An additional stop of overexposure produced more pastel color renditions with a warm flat contrast. ▲

A forthcoming issue will include testing results on Eastman films.

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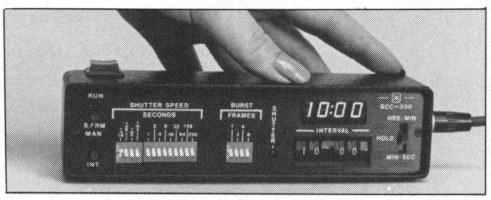

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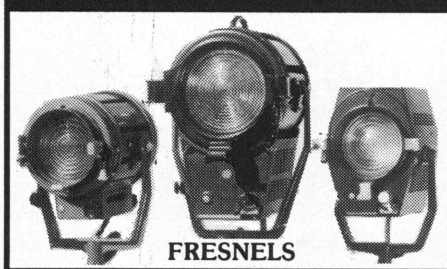
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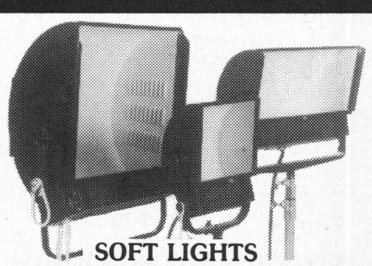
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The Naked Kiss
Produced and directed by Samuel Fuller.
Photographed by Stanley Cortez, ASC.
(The Voyager Company)

Samuel Fuller's story about a hooker trying to go straight in a crooked world is filled with unusual touches. Constance Towers is perfect as the strong-willed Kelly.

Stanley Cortez's masterful use of light and especially shadow underscores the psychological profiles of Fuller's characters. Cortez, as always, manages to express a strong personal style without overwhelming the director or the project.

• • •

Lightning Over Braddock: A Rustbowl Fantasy
Produced and directed by Tony Buba.
(Zeitgeist)

In the small town of Braddock, Pennsylvania, not far from Pittsburgh, the mills are closed and more than one third of the population is unemployed.

Street hustler Sal Caru dreams of Hollywood stardom; musician and union organizer Steve Pelligrino sings in clubs and abandoned factories; businessman Jimmy Roy gives pep talks on positive thinking; and Tony Buba makes movies.

Tony Buba's Braddock is a city of dreams. *Lightning Over Braddock* sparkles with his cinematic expertise. Filmmaking is Buba's way of making sense of his world. We are treated to the process of making a movie and that process becomes the film we see.

The look of the film goes from catch-as-catch-can to painstakingly planned. At the heart of this "rustbowl fantasy" is Buba's search for truth, justice, and the American way, which pretty much makes him Braddock's cinematic Superman.

• • •

The Rules of the Game
Produced by Claude Renoir, Sr.
Directed by Jean Renoir.
Photographed by Jean Bachelet.
(The Voyager Company)

The Rules of the Game is an endearing film about bourgeois society and the game of love. Jean Renoir's script, for all its frivolity, is tightly framed and precisely acted.

Jean Bachelet's deep focus photography and lyrical camera movement are in total harmony with Renoir's staging.

In the laserdisc form, *The Rules of the Game* is accompanied by Alexander Sesonske's excellent essay on the film, which is read by Peter Bogdanovich. Sesonske provides the viewer with valuable insights that heighten the video experience of this classic film.

• • •

The Dream Team
Produced by Christopher W. Knight.
Directed by Howard Zieff.
Photographed by Adam Holender, ASC.
(MCA Home Video)

Four mental patients are separated from their doctor while on a field trip to a ball game. Not much of a premise, but Joe Connolly and David Loucka's script gives Michael Keaton, Christopher Lloyd, Peter Boyle and Stephen Furst some very funny moments.

Adam Holender keeps the stars out of the shadows. It is high key character comedy all the way. Zieff directs another cult favorite in the tradition of *Slither* and *Hearts of the West.*

• • •

Dream Machine Volume Two: Computer Dreams
Produced and directed by Geoffrey de Valois.
(The Voyager Company)

Dream Machine Volume Two: Computer Dreams continues the story of computer graphics and animation that began with *Dream Machine: The Visual Computer.* Here are samples of commercial, industrial, and scientific projects presented with explanation and commentary. The two volumes together are a feast for anyone who enjoys dreaming with their eyes wide open. ▲

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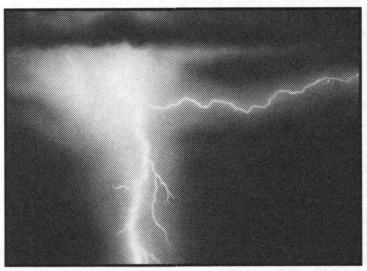

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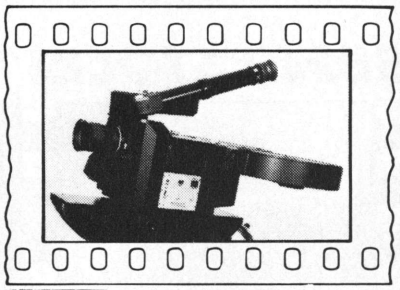

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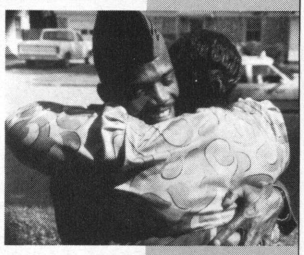

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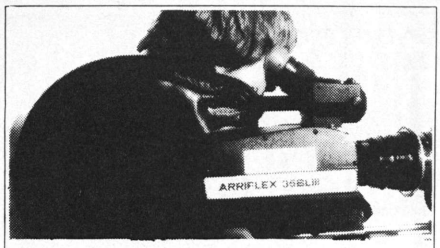

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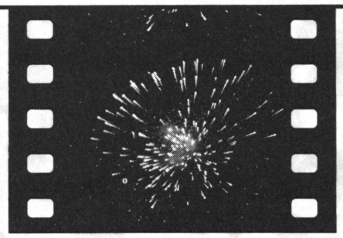

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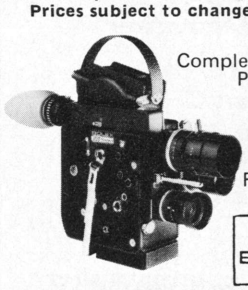

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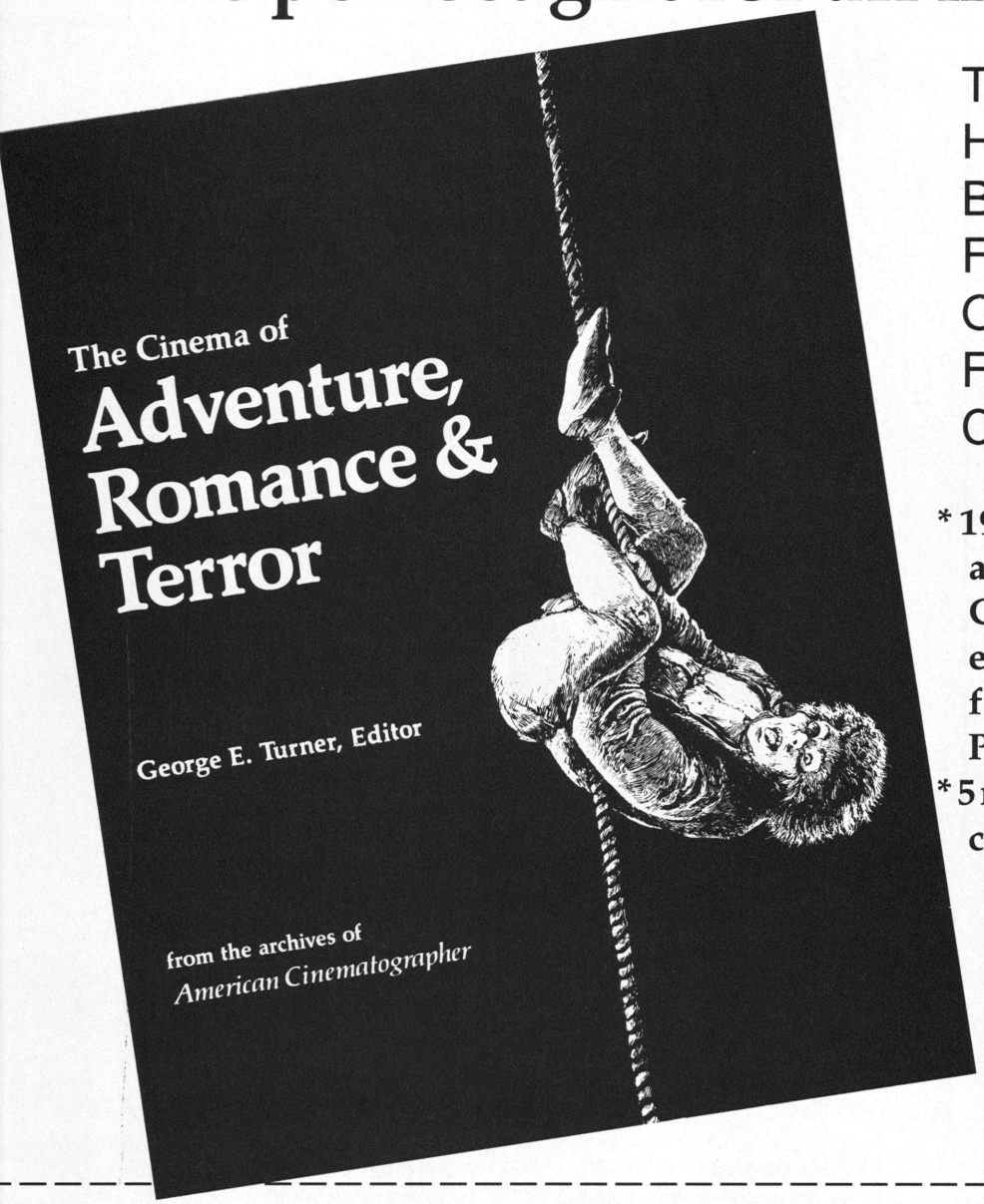

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In Memoriam

Paul Karl Lerpae, ASC, a pioneer special process and projection printing cinematographer, died October 5 at his Palm Springs home at the age of 89. A member of the Society since 1939, he was also an affiliate member of American Cinema Editors in recognition of his mastery of montage cutting and assembly. He is survived by his wife, Thelma M. Lerpae of Palm Springs; a daughter, Patricia L. Harries of Moraga, California; two nieces, and a brother-in-law, Roland Carpenter of Highland, California.

Born in Mexico City on April 7, 1900, Lerpae got a youthful start in films where many other cinematographers did — in the studio laboratories. Through his work as a laboratory technician at Standard Film Laboratories, Metro-Goldwyn and Paramount, he evolved a thorough knowledge of film printing processes. He also worked as an assistant cameraman, becoming adept in the intricacies of DeBrie, Bell & Howell and Mitchell cameras. Inevitably these skills were melded into the highly specialized field in which he became a dominant figure: optical printing effects.

In 1944 Lerpae received an Academy Award "for the design and construction of the Paramount traveling matte projection and photography device." Seven Paramount pictures for which he provided optical effects won Oscars for special effects: *Spawn of the North* (1938), *I Wanted Wings* (1941), *Reap the Wild Wind* (1942), *When Worlds Collide* (1951), *War of the Worlds, The Bridges at Toko-Ri,* and *The Ten Commandments* (1956). Academy Nominations were received by many others: *Union Pacific* (1939), *Dr. Cyclops* and *Typhoon* (1940), *Aloma of the South Seas* (1941), *So Proudly We Hail* (1943), *The Story of Dr. Wassell* (1944), *Samson and Delilah* (1950), *Unconquered* (1947), *The Greatest Story Ever Told* (1965).

The 1931 version of *Dr. Jekyll and Mr. Hyde* contained some of Lerpae's most dramatic effects, showing Fredric March change in almost imperceptible degrees from the handsome Jekyll into the hideous Hyde. These intricate dissolves were by far the most sophisticated examples of this technique that had been achieved. *Death Takes a Holiday,* 1934, had many striking scenes into which Lerpae superimposed a black spectre. He made a lot of people glow in the dark in the classic comedy-mystery, *Murder, He Says* (1945) and did the perfect split-screens that made it possible for Olivia deHavilland to co-star with herself in *The Dark Mirror* (1946).

Lerpae did intricate work on all of Cecil B. DeMille's pictures made after 1932, often editing as well as compositing the inevitable big montage sequences dear to DeMille. This includes the battle scenes of *Cleopatra* (1933), *The Crusades* (1935), and both versions of *The Buccaneer* (1938, 1958). A random selection of Lerpae's pictures includes *Paris in the Spring, Champagne Waltz, The Jungle Princess, The Plainsman, The Big Broadcast of 1937, The General Died at Dawn, Hollywood Boulevard, The Texas Rangers, Forgotten Faces, Artists and Models, Her Jungle Love, The Cat and the Canary, The Ghost Breakers, The Road to Singapore* (and the subsequent Crosby-Hope "Road" pictures), *Lady in the Dark, Donovan's Reef,* and literally hundreds of others.

Lerpae retired in 1971 and later moved to Palm Springs. ▲

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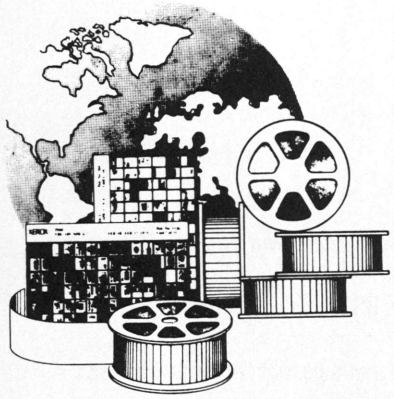

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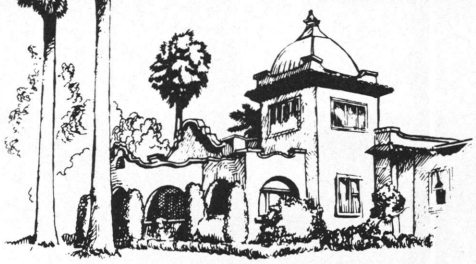

The first Fuji Gold Medal Award was presented to Richard Edlund, ASC, at the Society of Motion Picture and Television Engineers annual Honors and Awards luncheon on October 21. The presentation was made at the Los Angeles Convention Center.

The medal honors "the design and development of new or enhanced techniques or equipment that have contributed significantly to the advance of photographic or electronic image origination," according to SMPTE president Maurice L. French. Edlund, a long-time director of special effects, heads Boss Film Effects, producers of visual effects for such pictures as *Ghostbusters, 2010, Poltergeist, Fright Night, Poltergeist II, Date With an Angel,* and *Die Hard.* Earlier, at Industrial Light and Magic, he was a prominent member of the team responsible for the effects in *Raiders of the Lost Ark, The Empire Strikes Back, Return of the Jedi* and others.

Edlund has been awarded four Oscars and an Emmy for visual effects. He also holds three Academy Awards for technical achievements involving his part in the design and development of the Empire Camera, a beam-splitter optical composite device and the Zoom Aerio (ZAP) 65mm optical printer.

♦♦♦

Leo Chaloukian, owner-president of Ryder Sound Services and a member of the Board of Governors of the Academy of Television Arts and Sciences, is the new president and chairman of the executive committee of ATAS. His two-year term commenced October II.

An ASC associate member, Chaloukian served two terms as first and second vice president of the Academy. He has been chairman of the building committee for nine years, one of his duties being supervision of ATAS' involvement with "The Academy" real estate development in North Hollywood. This will be the future home of the Academy, its library, Hall of Fame, and the ATAS/UCLA Study Center. He has also served as chairman or member of several Academy committees and is active in many other industry organizations.

Chaloukian and his staff at Ryder have garnered more than 50 Emmy nominations, 36 Emmy awards, three AMPAS scientific and technical awards, two Oscar nominations, a recent Oscar for Best Achievement in Sound for *Platoon* and an Emmy for *Terrorist on Trial.*

♦♦♦

The latest director of photography to enter the educational field is Richard Glouner, ASC, who is instructing classes in cinematography and filmmaking at Golden State College in Chatsworth, California. "It's a wonderful experience," Glouner says. "I wish I'd started doing this years ago."

♦♦♦

After a hiatus from previous service, Harry Wolf, ASC, has been elected to a two-year term as a member of the Board of Governors representing the cinematographers branch at the Academy of Television Arts and Sciences.

Michael Margulies, ASC, continues on the Board of Governors, cinematographers branch, with one more year to serve.

♦♦♦

Howard W. Koch, Karl Malden, Walter Matthau and Howard Keel will be honored by the ASC at the annual Gala Affair to be held at the Bel Air Country Club January 13. Stanley Cortez, ASC, is the organizer and host of the event, which launches the Society's 71st year.

A veteran producer, director and production executive, Koch was president of the Academy of Motion Picture Arts and Sciences, 1977-79, and was honored by NATO as Producer of the Year in 1980. His films include such notable titles as *The Manchurian Candidate, Dragonslayer,* and *Airplane!* He produced eight Academy Award shows.

Malden, Matthau and Keel have given many fine performances to the screen. Malden currently is president of the AMPAS.

"We are fortunate to have an opportunity to acknowledge those who have contributed greatly to our rich legacy of cinematography," Cortez stated.

▲

25 National Treasures

In response to the ongoing furor over film preservation and undue alteration—including colorization, cropping or scanning of wide format films, time compression, and just plain chopping—75 American films over the next three years will be deemed "National Treasures" by the Library of Congress.

By law, a film so honored must carry a disclaimer if presented in a form altered in any way from the original. Only films in release for 10 years or more qualify. The National Film Preservation Board was charged with gathering recommendations from the public and from various organizations, as an aid in the unavoidably difficult selection process.

The following is an excerpt from a statement made by the ASC before the National Film Preservation Board on July 19:

"The American Society of Cinematographers, formed in 1919, has been honored with members over the years who have photographed almost all of the motion picture classics made since the art form began . . . (as) the visual work you seek to preserve is essentially the cinematographer's making . . . we would hope and trust that you will invite input from, and seek counsel with, the ASC in your future deliberations. We stand ready to assist you and to join you in both shouldering the responsibilities and in achieving the goals assigned you by Congress."

Subsequently, the ASC submitted its recommendations (the results of a special ballot) for inclusion in the first year's list of 25 films. To ensure that the voice of the cinematographer continues to receive due consideration, representatives of the ASC travelled to Washington, DC in late September to reiterate their position before the Preservation Board.

The following is a list of the Library's final 25 for this year. It is not intended to represent the "best" 25 American films, but to "suggest to the American public the breadth of great American filmmaking," according to James Billington, Librarian of Congress. All but three were photographed by or with the consultation of members of the American Society of Cinematographers.

The Best Years of Our Lives (1946)
Gregg Toland, ASC
Casablanca (1942)
Arthur Edeson, ASC
Citizen Kane (1941)
Gregg Toland, ASC
The Crowd (1928)
Henry Sharp, ASC
Dr. Strangelove; Or How I Learned To Stop Worrying and Love The Bomb (1964)
Gilbert Taylor, BSC
The General (1927)
J. Devereaux Jennings, ASC and Bert Haines
Gone With The Wind (1939)
Ernest Haller, ASC, Lee Garmes, ASC, Joseph Ruttenberg, ASC, Ray Rennahan, ASC, Wilfred Cline, ASC
The Grapes of Wrath (1940)
Gregg Toland, ASC
High Noon (1952)
Floyd Crosby, ASC
Intolerance (1916)
Billy Bitzer and Karl Brown, ASC
The Learning Tree (1969)
Burnett Guffey, ASC
The Maltese Falcon (1941)
Arthur Edeson, ASC
Mr. Smith Goes to Washington (1939)
Joseph Walker, ASC
Modern Times (1936)
Rollie Totheroh, ASC and Ira Morgan, ASC
Nanook of the North (1922)
Robert Flaherty
On the Waterfront (1954)
Boris Kaufman, ASC
The Searchers (1956)
Winton Hoch, ASC
Singin' In The Rain (1952)
Harold Rosson, ASC
Snow White And The Seven Dwarfs (1937)
Ray Rennahan, ASC, Technicolor consultant
Some Like It Hot (1959)
Charles Lang, Jr., ASC
Star Wars (1977)
Gilbert Taylor, BSC
Sunrise (1927)
Charles Rosher, ASC and Karl Struss, ASC
Sunset Boulevard (1950)
John Seitz, ASC
Vertigo (1958)
Robert Burks, ASC
The Wizard of Oz (1939)
Harold Rosson, ASC and Allen Davey, ASC

— D.H.

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